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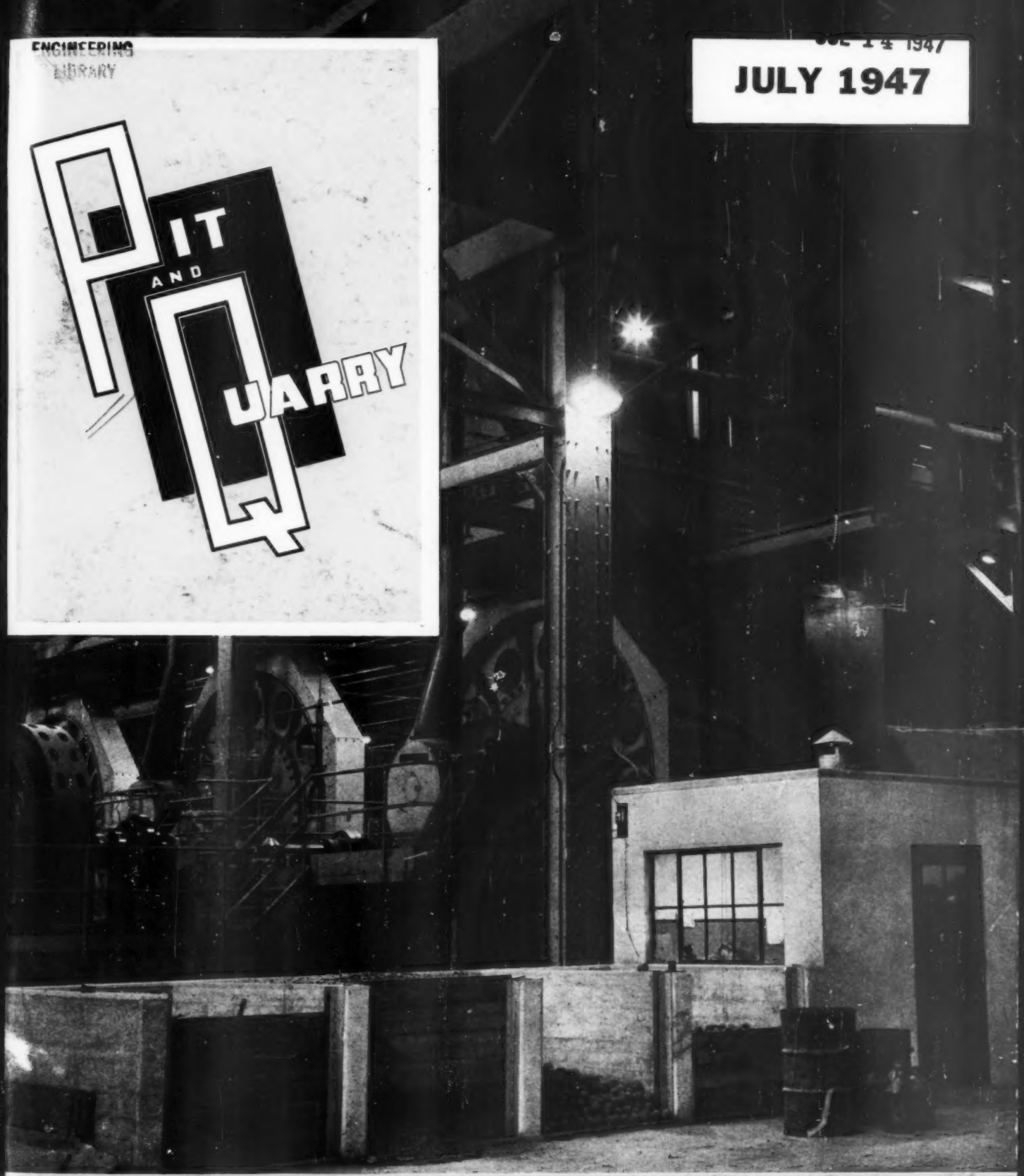
# PIT AND QUARRY

JULY 1947



Clinker-grinding department of Universal Atlas Cement Company's plant at Northampton, Pa.

*In this Issue*

**The Portland Cement Association—First of a Series of Association Articles • Cement Developments outside the U. S. • Complete Reports on the National Lime Association and National Industrial Sand Association Conventions**

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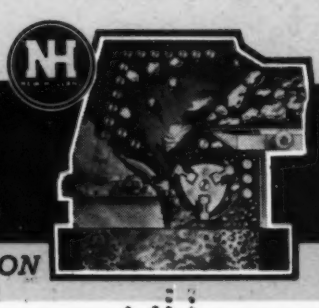


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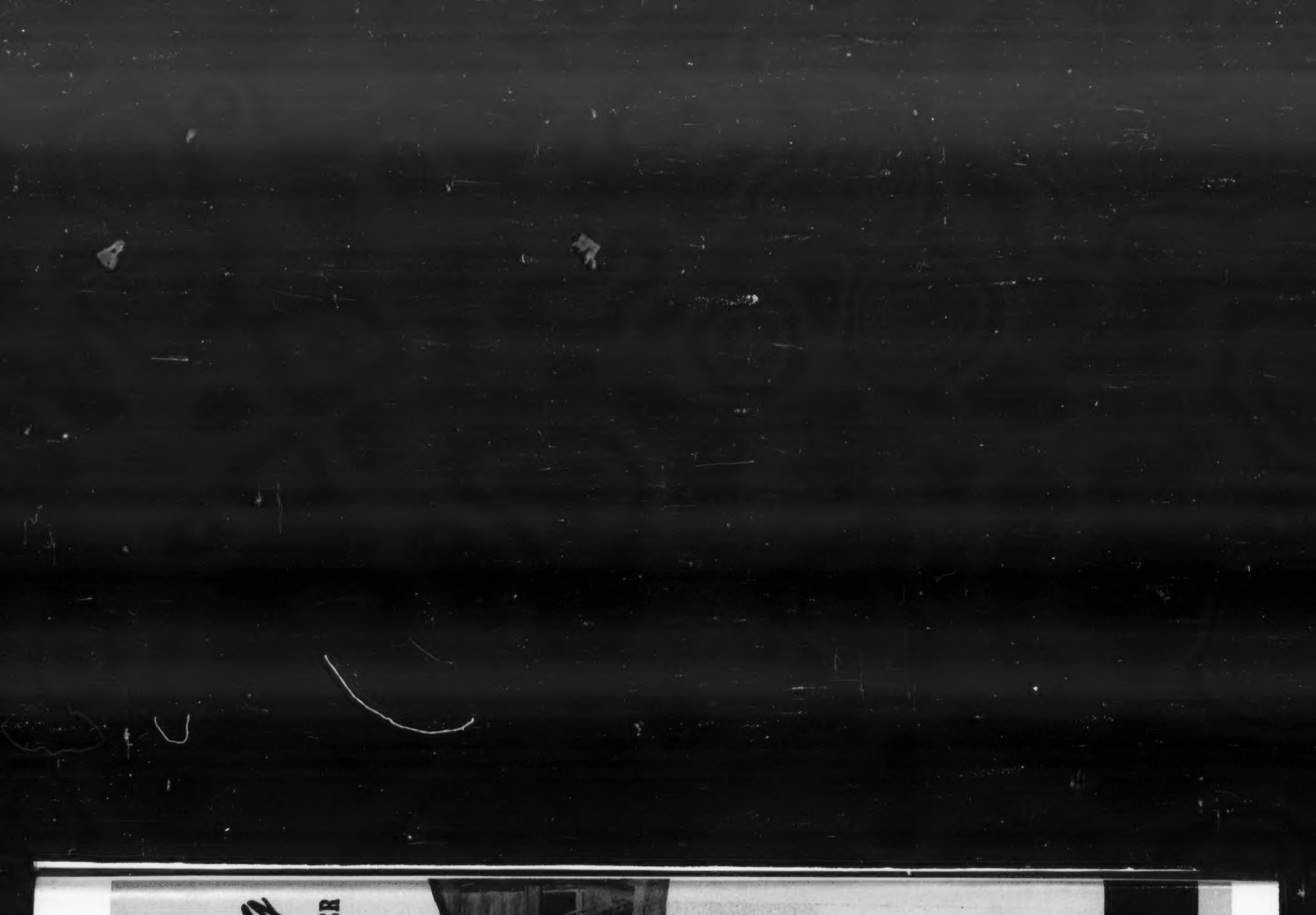

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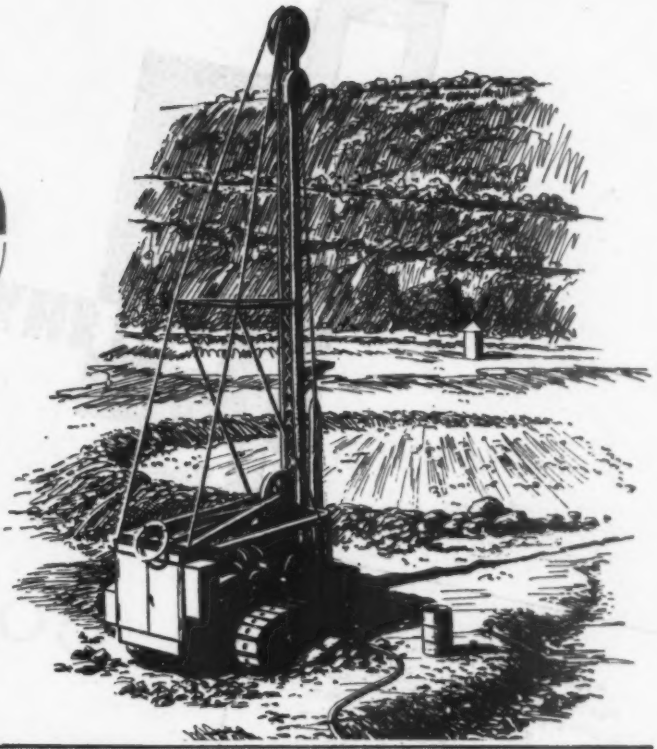
## Avoid

# Lost Tonnage

## Breakdowns



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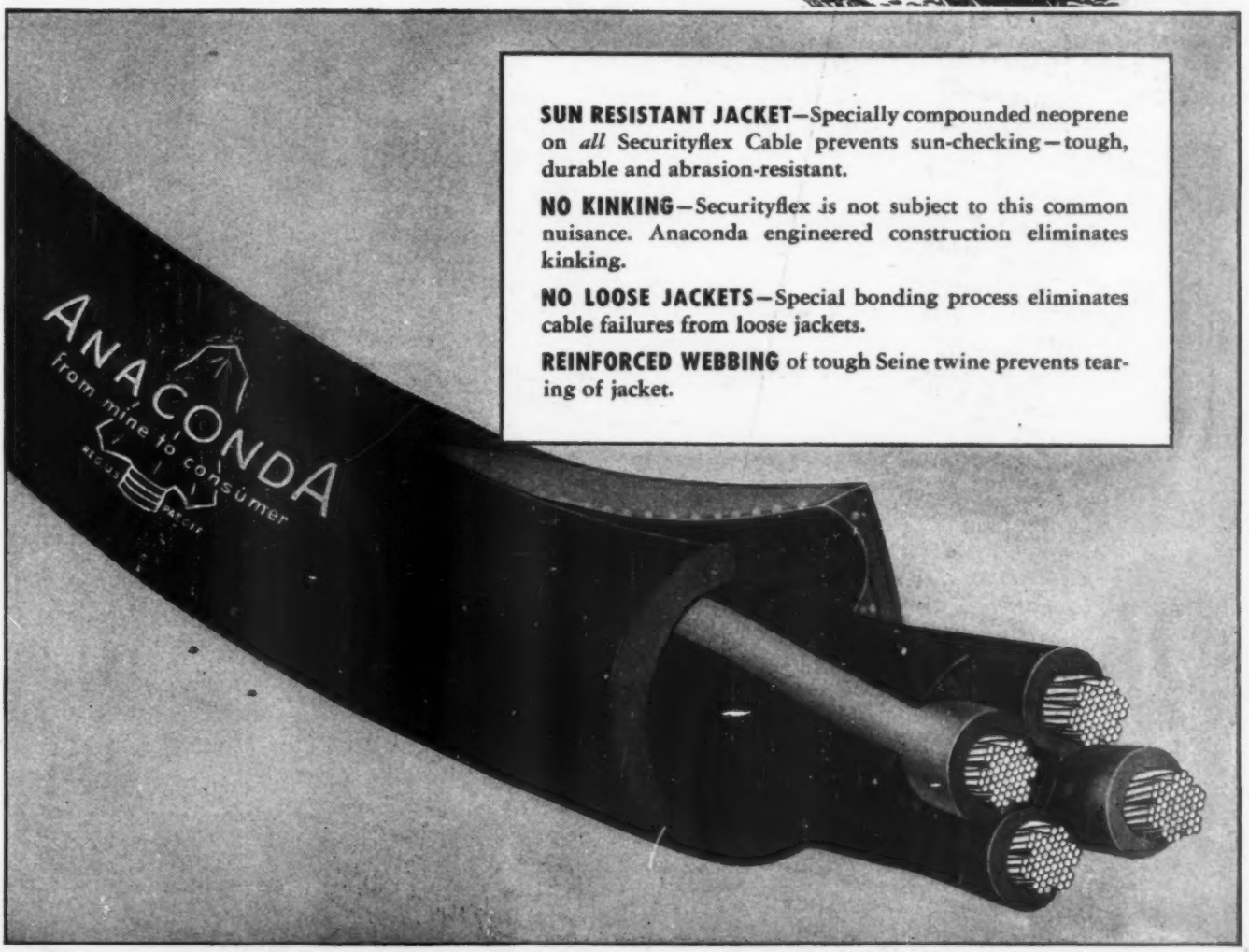


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PIT AND QUARRY

JULY 1947
Vol. 40 No. 1

# CONTENTS

Editorials . . . . . 58
News of the Industry . . . . . 61
Washington News Letter . . . . . 68
N.L.A.-Operators' Meeting . . . . . 69
Annual Convention of N.I.S.A. . . . . 76
New $500,000 Phoenix Plant . . . . . 79
Men of the Industry . . . . . 83
The Portland Cement Assn.—45 Years of Outstanding Service to Industry . 84
Ideal Converts Wartime Sinter Plant . 90
Gildemeister Builds a New Cement Plant 96
Lawrence Portland's New Kiln Dept. at Northampton . . . . . 98
Universal Atlas Installs Dust Collector . 101
Rock Weathering in Alkali-Aggregate Reaction . . . . . 102
World Picture of the Cement Industry . 104
Instrumentation and Control in the Lime Industry . . . . . 161
Screenings . . . . . 167
The Lime Plant Operator . . . . . 168

**The Concrete Manufacturer**

News of the Industry . . . . . 195
Chicagoland Plant Adds Dump Truck Service . . . . . 197
Michigan Concern Justifies Owners' Faith in Venture . . . . . 198
"The Kiln That Couldn't Be Built" . . 200
The Value of Testing Concrete Products for Compressive Strength . . . . 203
Operator Aims at 100,000 Units per Day 206

Personal Mention . . . . . 171
Obituaries . . . . . 172
New Machinery . . . . . 173
Trade Notes . . . . . 184
Legal Decisions . . . . . 188
Traffic News . . . . . 191
Trade Literature . . . . . 192
Index to Advertisers . . . . . 262

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PIT AND QUARRY IS INDEXED IN THE ENGINEERING INDEX

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# EDITORIAL

## *Our Trade Associations*

IN THIS issue of PIT AND QUARRY appears the first of a series of staff-written articles on the trade associations of the nonmetallic-mineral industries in this field. This one tells all about the Portland Cement Association, its history, personnel, aims and accomplishments. Other articles in subsequent issues will give similar information about the dozens of other national, regional and state associations of these industries.

This series of articles is not a new idea. It first occurred to us back in code days when the staffs and members of many of these associations worked so tirelessly with the government in an effort to get our industrial machinery working again. As business picked up, the idea fell by the wayside but was emphatically resurrected by the manner in which these associations protected the rights of their industries and members, many of which were being threatened by unwise and sweeping governmental edicts. These accomplishments, out of many others, are mentioned here because they have not received as much publicity as have others which have also benefited whole industries, including non-members of these associations.

MOST of these industry associations have grown with their industries, or even more rapidly, and many of them now include in their membership the majority of the producers in their field, the bulk of the production in these fields, or both. Many of them have at their heads men who are outstanding authorities on governmental, legal, business and technical matters and who have been honored as such by their contemporaries, technical societies and business organizations, and the government. It is our belief that no producer can lose and that most of them can profit through membership in these associations and the many contacts and friendships developed through such membership.

## *Let's All Work*

RECENTLY we have been hearing more and more often the ancient maxim that "there is no substitute for work," and its endless variations. These are being published in newspapers, magazines, direct-mailing pieces, are broadcast orally, etc. Most of them have the same theme, that only old-fashioned hard work is necessary to solve all our problems and bring back prosperity for all. None of them tells how to sell the idea.

Employers seem to be almost unanimously agreed on that point. Labor seems less certain, in some cases violently so. Both seem to have a case or at least good arguments. It is doubtful if anyone seriously questions the above and similar maxims; and it is probably true that if everyone turned out an honest day's work, some of our problems would be solved and the solution of others made easier. But less than 50 percent of the people believe that hard work pays off today, according to a recent nationwide public opinion poll.

It used to be that many people worked hard because they liked to work and many of them got their only reward in the satisfaction of a job well done. Others would have preferred to loaf but economic necessity and the fear of losing their jobs kept them going. A small percentage just loafed regardless of consequences and probably always will.

In recent years the growth of labor unions and the shortage of help have considerably increased the feeling of job security of the lazy worker; and the "slow-down" pressure within some unions, whether official or not, has slowed down even those who like to work.

Getting labor, and this means all employees, back to the old-fashioned belief that hard work will bring them the rewards they desire is a tough job and talking alone won't do it. Labor must have proof and the employer must furnish it because he, individually and as a group, is largely responsible for this condition. Had employers in the past properly rewarded the workers who took their jobs seriously and worked hard and well, it is quite probable that conditions now might be quite different.

PROBABLY the main reason for the present wide rift between employer and employees, however, is the lack of close contact and understanding of each other's problems. Absentee ownership has long been cited as one reason for this rift, and the growing list of huge "soulless" corporations as another. Little mention has been made of the employer who, though present most of the time, might as well or even better be absent as far as labor-management relations are concerned.

Employers must take the lead in establishing better relations with their employees and the unions representing them. This can be done, first by meeting them on the same plane and making them realize that they are on the same team and that the boss is actually a leader they will be willing to follow and who can inspire the loyalty necessary for success in any mass endeavor.

Secondly, employers must provide some material incentive for hard and conscientious work. There are many incentive, bonus, profit-sharing and other plans which have worked successfully in large and small organizations in many different fields. A number of tried and proved plans are available at small cost, eliminating the necessity of going through a tedious trial-and-error process. The important thing is to make it possible for each employee to profit directly through his own individual efforts and also collectively through group effort. Only in this way can real cooperative effort be achieved and maximum benefits obtained.

Many will say that it is now too late to start anything of this kind, that the unions have control and will keep it. This defeatist philosophy is based on the assumption that all unions are aiming at domination of industry and will continue in that direction. It overlooks the fact that many unions, perhaps most of them, are quietly working toward a practical solution of labor problems while others less ably led are making the headlines. It also overlooks the fact that union membership opinion can change and incompetent or dishonest leadership can be overthrown. Labor unions are here to stay and they have their proper place in industry. The most important step toward industrial peace, increased production, and lower cost that employers can take is to show, by actions as well as words, that they are ready to provide suitable rewards for loyal, hard-working and conscientious employees.

## $3,500,000 Improvements Announced by Pennsalt For Wyandotte Plant

The Pennsylvania Salt Manufacturing Company announced it now has under construction at its Wyandotte plant additional boilers and allied power generating equipment, including a completely new modern power plant building, at a cost of more than $3,500,000.

In addition to this new equipment, Pennsalt is installing fly ash collectors for its three large pulverized-coal burning boilers at an estimated cost of $200,000. The new boilers also will be equipped with the fly ash collectors, made by the Western Precipitation Corp.

In the existing boilers the company now is installing new induced-draft fans and motors to take care of the additional draft loss placed on the boilers by the fly ash collecting equipment in the duct system through which products of combustion are discharged. The steel superstructure for the fly ash collecting equipment on the present boilers has been erected; this part of the project will be completed and in operation before the end of this year, Pennsalt officials said.

The new boilers and power equipment reportedly will be completed during 1948. The actual combustion space of these new boilers has been designed to permit use of the lower grade coal, the only grade now obtainable. Engineers and constructors for the new plant and equipment are Ford, Bacon and Davis, Inc., of Philadelphia and New York.

## Cement Association Leader Cited for Safety Work

A. J. R. Curtis, safety director of the Portland Cement Association of Chicago, has been voted a special award for his leadership in maintaining an outstanding safety record during the past two decades in the 160 member plants of the organization, according to word from Dr. R. R. Sayers, president of the Joseph A. Holmes Association and director of the U. S. Bureau of Mines.

In charge of the Portland Cement Association's safety activities since their inception in 1926, Mr. Curtis has been responsible for numerous innovations promoting safety in member plants, which include mills and quarries in 33 states and five Canadian provinces, employing between 25,000 and 35,000 men.

Mr. Curtis was graduated from Lewis Institute at Chicago. For six years, he was in charge of educational and promotional campaigns for the Universal Portland Cement Company and also conducted research on concrete problems. He was employed by the Portland Cement Association on January 16, 1916, to direct a nationwide educational program on concrete and served as an inspector of U. S. military concrete schools during World War I. He is a member and past president of the American Society of Agricultural Engineers, secretary of the National Conference on Concrete House Construction, past secretary of the Cement and Quarry Section of the National Safety Council and a present member of the Council's Executive Board, a member of the American Society of Safety Engineers, and a member of the Board of Trustees, Illinois Institute of Technology.

A. J. R. Curtis

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The annual fall meeting of the National Industrial Sand Association will be held October 1 to 3 at the Grove Park Inn, Asheville, N. C.

## Permanente Cement Co. Given Operating Rights Of Big Seattle Plant

Assignment of Permanente Cement Company as operator of Pacific Coast Cement Company's Seattle, Wash., plant facilities was announced today by J. A. McEachern, president of General Construction Company.

As lessor of the Northwestern cement facilities, General Construction Company has arrived at satisfactory terms, McEachern explained, by which the Permanente Cement Company will manufacture cement at the Seattle plant through February, 1948.

In Oakland, Permanente officials said the Seattle plant, which is under operation at the present, will be known as its Diamond Division and that its rated capacity augments by one million barrels Permanente's San Jose, Calif., plant production of 5,500,000 barrels annually.

Manager of the Permanente Diamond Division, which employs some 125 persons, is Gordon Tongue who has a background of 25 years in the cement industry. The entire production of the plant will be marketed throughout Northwestern United States, Canada and Alaska, it was revealed by Ed Kendall, Diamond Division sales manager, who represented Permanente in the Northwest prior to its acquisition of the new plant.

Limestone for the Seattle plant will be obtained from a deposit at View Cove, Alaska, which was included in the above assignment. The raw material will be hauled direct to the plant on the S.S. *Diamond Cement*, a vessel which is now under charter to Permanente Cement Company.

Under the supervision of Plant Superintendent Pete Olive, formerly associated with Permanente at its California facilities, the Diamond Division plant will manufacture the various types of standard Portland Cement, Permanente Pronto Cement and Brick Mix Cement.

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At the surface phosphate mine of the San Francisco Chemical Company near Montpelier, Ida., from 40 to 80 tons of material is shipped out daily, with a considerable part of the output marked for Japan. The phosphate is simply taken from the mine and dried and ground; it is used as a farm crop fertilizer.

## High Ratio of Violation Found by Inspectors Of Labor Department

The 1946 annual report of the Wage and Hour and Public Contracts Division, U. S. Department of Labor, shows that violations of the minimum wage, overtime and child labor provisions of the Fair Labor Standards Act and the Public Contracts Act were found in 58 percent of the 600 inspections made in the stone, clay and glass products industry during the year ending on June 30, 1946. As a result of these findings, $276,000 in back wages was returned to about 6,000 underpaid employees.

Violations of the overtime provisions of the two laws were the most common type found. Of the plants inspected, 9 percent had violated the minimum wage provisions of the Fair Labor Standards Act, and 10 percent had violated the child labor provisions.

William R. McComb, recently named administrator of the divisions, stated that employers who are uncertain about the application of the laws to their employees may apply to the regional offices of the divisions. These are located in the following cities: Boston, New York, Philadelphia, Cleveland, Richmond, Atlanta, Birmingham, Nashville, Chicago, Minneapolis, Kansas City, Dallas and San Francisco.

## A. B. Stall Named Treasurer Of Portland Cement Assn.

A. B. Stall was elected treasurer of the Portland Cement Association and Edward F. MacArthur was named assistant treasurer at a recent meeting of the association's board of directors in New York. Mr. Stall succeeds Frank L. Page, veteran treasurer, who retired on April 30. Mr. MacArthur succeeds to the post held by Mr. Stall since 1941.

Mr. Stall has been a member of the association staff for 31 years, having successively filled the positions of assistant auditor, auditor and assistant treasurer. He was general accountant for the *Chicago Tribune* before being employed by the association.

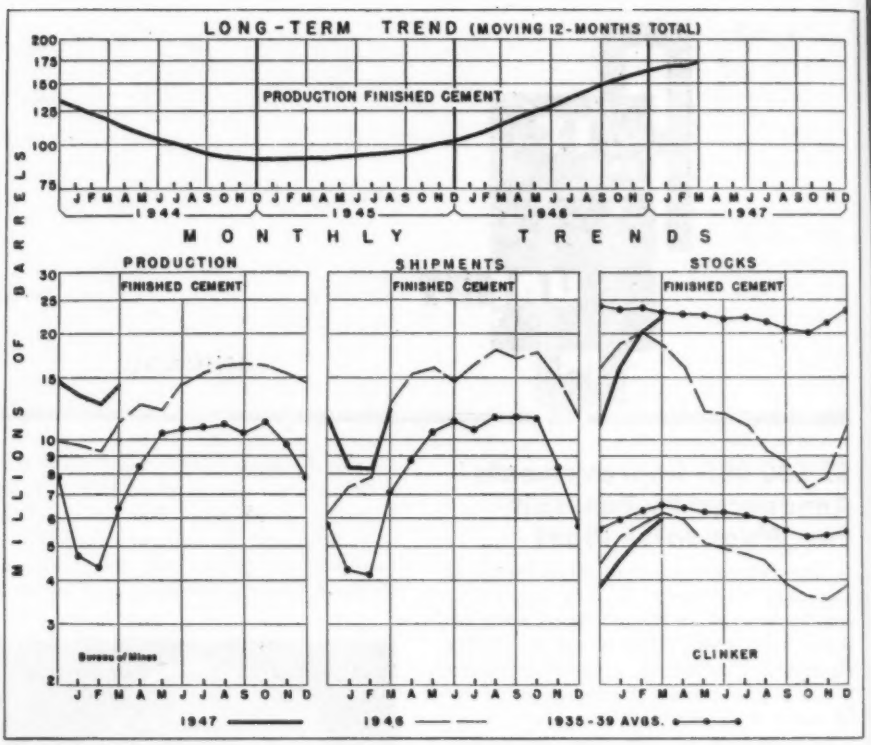
Mr. MacArthur came to the association in 1941 from the accounting firm of Price, Waterhouse & Co. From 1943 until early in 1946 he served with the armed forces of the United States, ending his service as an auditor in the Signal Corps.

Mr. Page, retiring treasurer, has served the association since 1916. He is now living in Boulder, Colo.

## Secretary Krug Sets Up Western Phosphate Agency

Secretary of the Interior J. A. Krug has established a unified Department of the Interior program for the development of a Western phosphate industry.

For its implementation the program will be co-ordinated in the West through the Pacific Northwest Coordination Committee, a body composed of agencies such as the U. S. Bureau of Mines, the Geological Survey, The Bureau of Land Management, the Office of Indian Affairs, the Bonneville Power Administration, the Bureau of Reclamation, the National Park Service and the Fish and Wildlife Service.




Production of 14,205,000 barrels of finished portland cement in March, 1947, reported to the U. S. Bureau of Mines was 26 percent greater than that reported for March, 1946. Mill shipments reached 12,133,000 barrels, a decrease of 5 percent from that reported in the same month of 1946. Production for the first quarter of 1947 of 40,229,000 barrels of cement was 33 percent above that reported for the first quarter of 1946, but shipments show an increase of only 4 percent. The difference is shown in stocks which have increased from 10,921,000 barrels on December 31, 1946, to 22,184,000 barrels on March 31, 1947. Clinker production of 14,903,000 barrels in March, 1947, was 24 percent greater than that for the same period of 1946.

Demand for cement, as indicated by mill shipments, was higher in eight districts and lower in 11, than that reported for March, 1946. The decline in demand for cement is attributed to a continued shortage of railroad cars, the rapid rise in costs, and a shift from a seller's toward a buyer's market in the construction industry.

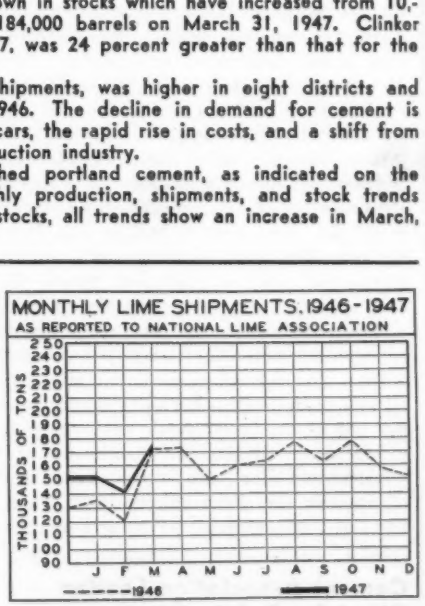
The long-term trend in production of finished portland cement, as indicated on the accompanying chart, continues upward. Monthly production, shipments, and stock trends also are shown. With the exception of clinker stocks, all trends show an increase in March, 1947, over the preceding month.

## Big Quarry Blast Loosens 600,000 Tons of Limestone

At Fort Spring, W. Va., a few weeks ago 600,000 tons of limestone was blasted from the quarry face of the Acme Limestone Company. Reported to be the largest blast ever set off in the Eastern states, the 200,000-pound detonation was supervised by a duPont explosives expert, who was assisted by six technicians.

About one-half of the rock will be used for the construction of the Bluestone dam. Another smaller blast will be made at the Acme quarry this fall.

Rheem Research Products of Pasadena, Calif., has gone out of the perlite business. The firm has sold its Arizona plant to the Great Lakes Carbon Corporation of Chicago.




According to data collected by the National Lime Association, 45 companies in March, 1947, shipped 174,190 tons of lime (102,210 quicklime; 71,990 hydrate). Reporting companies represent 45.6 percent of the association members' total capacity of record. Based on Pit and Quarry's estimates for the remainder of the industry, the total shipments for the month by all plants were approximately 420,200 tons. Shipments of lime by users for March, 1947, were:

| | Quicklime (tons) | Hydrate (tons) |
|---|---|---|
| Agricultural | 1,872 | 18,902 |
| Building | 12,197 | 29,011 |
| Chemical | 88,141 | 24,067 |
| Total | 102,210 | 71,980 |

## Universal Atlas Announces Four Important Changes In Compan·· Personnel

Four appointments and one retirement among members of the Universal Atlas Cement Company's staff have been announced by L. M. Funderberg, vice-president in charge of operations. All changes became effective on June 1.

Francis A. Hennigan, industrial engineer in New York, was appointed assistant to Mr. Funderberg. L. J. Boucher, former assistant plant manager at Northampton, Pa., has become manager there, succeeding Morrie W. Winsch, who has retired. Mr. Boucher's former post has been filled by Raymond W. Smith, who has been assistant general operating foreman at Northampton. The new assistant manager at Independence, Kan., is Alfred H. Zimmerman.

Mr. Hennigan in earlier years was associated successively with the Blaw-Knox Company, the American Bridge Company, the Crucible Steel Company and the Carnegie-Illinois Steel Company. He joined Universal in 1936. From 1942 to 1945 he served in the Ordnance Department, U. S. Army.

Mr. Boucher has been with Universal since 1915, having previously served in engineering capacities with several well-known firms. While with the Arctic Coal Company, he was located at Spitsbergen, Norway.

Mr. Winsch has rounded a career of 43 years of service in the cement industry, all of which he has spent in various positions at Universal. In 1927 he became plant manager at Northampton. He is known as a leading counsellor in the conduct of industrial relations throughout the cement producing area in the Lehigh Valley.

Mr. Smith joined Universal in 1921 at the Northampton plant and was promoted in 1926 to mill foreman. Later he became foreman and in 1945 assistant general operating foreman. Mr. Zimmerman was named field engineer for Universal at Waco, Tex., in 1936. In later positions he was transferred to Chicago and New York. He returned to the company last year after four years of military service, to become practice engineer at Independence.

## 1-Mile Belt Line Establishes Outstanding Service Record

Among the industrial curiosities of that wonderland, California, is a rubber-belt railroad a mile long which has operated continuously 24 hours a day for five years at the Permanente Cement Company's plant at Permanente, Calif. The conveyor system runs at the rate of 450 feet a minute and requires no power consumption when it is loaded; but it consumes 150 horsepower when it is idling. It carries its load down a 3 percent grade.

The 48-inch belt, installed by the Goodyear Tire and Rubber Company, carries 2,000 tons of rock per hour from the quarry to the plant. It runs on 1,425 idlers containing 8,850 roller bearings.

## Freeport Sulphur Co. Forms New Fine-Grinding Subsidiary

The Freeport Sulphur Company of New York, N. Y., has announced the purchase of assets of the International Pulverizing Corporation and affiliated companies, including the American Pulvertizing Corporation, Micronizer Processing Co., Inc., and Micronized Products, Inc. A new subsidiary, the Micronizer Company, has been formed, representing a merger of these properties. Plants at Moorestown, N. J., and Charlotte, Mich., will be operated by Micronizer.

The new firm will engage in grinding materials to extremely fine particle sizes by a process known as "micronizing."

## U. S. Bureau of Mines Announces New Yearbook Of Minerals Industries

Long recognized as an authoritative source of information on domestic and foreign mineral commodities, the latest volume of the *Minerals Yearbook* of the U. S. Bureau of Mines has just come off the presses, according to Director R. R. Sayers. Price $4.

With 80 chapters and 1,689 pages, the new *Yearbook* gives detailed data on the production, distribution, and consumption of all known mineral commodities for the calendar year 1945.

Separate chapters may be obtained from the Government Printing Office at the following prices:

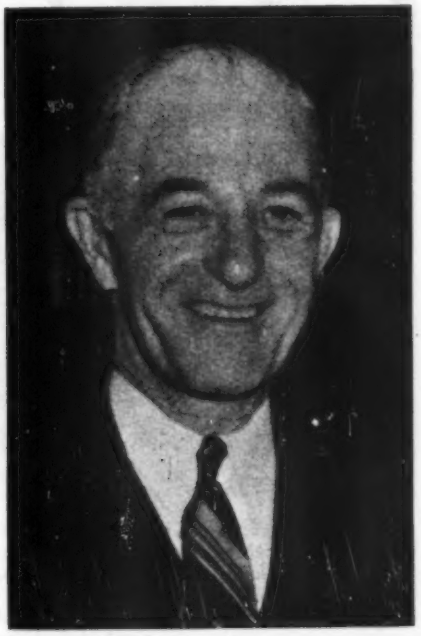
*General Summary:* Review of the Mineral Industries (10 cents); and Statistical Summary of Mineral Production (15 cents).

*Nonmetals and Fuels:* Abrasive materials (10 cents); Asbestos (5); Asphalt and Related Bitumens (5); Barite, Witherite, and Barium Chemicals (5); Carbon Black (5); Cement (10); Clays (10); Bituminous Coal and Lignite (15); Pennsylvania Anthracite (15); Coke and Byproducts (15); Crude Petroleum and Petroleum Products (20); Feldspar (5); Fluorspar and Cryolite (10); Fuel Briquets and Packaged Fuel (10); Gem Stones (5); Gypsum (5); Lime (10); Magnesium Compounds and Miscellaneous Salines (5); Mica (10); Minor Nonmetals (10); Natural Gas (10); Natural Gasoline and Liquefied Petroleum Gases (10); Nitrogen Compounds (5); Peat (5); Phosphate Rock (10); Potash (10); Salt (10); Sand and Gravel (10); Slate (5); Stone (10); Sulphur and Pyrites (5); and Talc, Pyrophyllite, and Ground Soapstone (5 cents).

*Mine Safety:* Employment and Injuries in the Mineral Industries (10 cents).

*Foreign Minerals:* Foreign Minerals Review (15 cents).

F. A. Hennigan



Morrie W. Winsch

L. J. Boucher

• Shown in the illustration above is a new Pioneer Two-Unit plant used by the E. W. Coons Company of Hibbing, Minn., for crushing and screening highway and airport gravel. The plant consists of a No. 150-PG primary and a No. 140-S secondary crusher. A Caterpillar D-8800 supplies the power for the primary; and the secondary is powered by a D-13000. A complete story of an older Coons plant appeared in PIT AND QUARRY for November, 1940, on page 50.

## Kelley Island Lime-Transport To Help Speed Vets' Housing

A plant with an output large enough to supply finishing lime for 200 new veterans' houses daily is currently under construction for the Kelley Island Lime and Transport Company at White Rock, O.

The new facilities, which are being installed by the H. K. Ferguson Company, will consist of a plant for processing kilned lime, a product used for plastering walls.

## J. E. Baker Company Appoints York Firm Publicity Agent

The J. E. Baker Company of York, Pa., producers of road stone, railroad ballast, agricultural limestone, lime, fluxes and refractory materials, recently assigned the W. H. Long Co. of York as agents to handle its national advertising.

Quarries of the company are located at Billmeyer, Thomasville and York, Pa , Millersville, O., Inwood, W. Va., and Blue Mount, Md.

## Safety Awards Presented to Quarries, Nonmetals Plants

For heroic action in risking their lives to save others and for extraordinary courage in emergencies the Joseph A. Holmes Safety Association recently awarded medals and diplomas to 11 individuals in the mineral and allied industries. For outstanding safety performance records or better-than-average success in supervisory work, the association also presented certificates of honor to 110 companies and to 13 individuals.

Among the firms so honored were the following: Lehigh Portland Cement Company's plant at Union Bridge, Md.; Lone Star's quarry at Dallas, Tex.; Medusa Portland Cement Company's York Gray plant, York, Pa.; the Monarch limestone and dolomite quarry of the Colorado Fuel and Iron Corporation at Garfield, Colo.; Permanente Cement Company's quarry at Permanente, Calif.; Certain-Teed Products Corporation's Acme, Tex., plant; National Gypsum Company's plant at National City, Mich., and its gypsum mine at Akron, N. Y.

At the annual directors' meeting of Queenston Quarries Limited, Hamilton, Ont., the following officers were elected: R. G. L. Harstone, president; A. Michie, vice-president and general manager; D. E. Steele, secretary; C. H. Doolittle, treasurer.

## Attaining of Housing Goals Depends upon Continued Federal Control—Creedon

Housing Expediter Frank R. Creedon, in a recent statement, estimated that 1,038,000 new homes can be completed in 1947, including 760,000 permanent dwellings, if federal controls are retained for a few more months. He added that 610,000 new permanent homes have been completed this year or are under construction and will be finished.

Mr. Creedon predicted that another 150,000 homes can be started and made ready for occupancy in 1947 and that non-permanent buildings will add 278,000 to the total.

## Superior Cement Co. Builds New $120,000 Packhouse

A new modern packhouse, built of steel frame and corrugated metal siding and roofing, is being constructed for Superior Cement Corporation at Superior, O., by the Rust Engineering Company, Pittsburgh, Pa., at a cost of $120,000.

The 65- by 100-ft. structure is being erected to replace a packhouse destroyed by fire last October.

The Sulphur Springs Gypsum Company of Thermopolis, Wyo., has purchased 1,200 acres of gypsum-bearing land four miles northeast of Cody, Wyo., and plans are being made to market 200,000 tons of gypsum annually from the company's holdings. Company officials reported that the newly-acquired land contains 110 feet of gypsum with a small amount of overburden.

• Robert Kidd, captain of the Marquette Cement Mfg. Company's bowling team at Oglesby, Ill., is shown receiving the Marquette Cement Inter-Plant Championship Trophy from Frank Moyle, director of operations for Marquette, upon winning the play-off held in Chicago on May 10. Left to right: Ralph Moyle, plant superintendent; John Stella, John Reed, Walter Eichhorst, Theodore Kidd, Robert Kidd, captain, and Frank Moyle. All team members are employees in the Marquette plant at Oglesby, who won the trophy in competition with teams from other Marquette plants in Des Moines, Ia., and Cape Girardeau, Mo.

## Signing of Agreement Ends Critical Shutdown in 34 Eastern Cement Plants

After a walkout of 20 days approximately 8,000 striking workers in 34 cement plants in Pennsylvania, Maryland and New York began to return to their jobs on May 21. Within a few days shipments were being made from the Lehigh Valley area in sufficient quantity to relieve the cement-starved construction projects which had suffered a protracted delay during the strike.

Twelve companies signed an agreement with representatives of the United Cement, Lime & Gypsum Works (A.F.L.).

The contract grants a 15-cents-an-hour wage increase, as agreed to prior to the strike, but eliminates three provisions in the old contract applying to packing-house crews. It is agreed that management shall have the right to determine the schedule for packing and, if necessary, to call out additional packing crews during peak shipment periods. There shall be no prohibition against packing cement after 6 p.m. or any other time. Also, there shall be no penalty premium rates for packing. The wage increase is retroactive to April, when the old contract expired.

## Cementing Barge Launched By Halliburton Off Gulf Coast

Among the many current conversions of war gear to peacetime equipment is the *Halliburton 201,* first of a fleet of cementing barges to be outfitted by the Halliburton Oil Well Cementing Company, Duncan, Okla. The craft, a converted LCT, will ply lakes, bays, bayous and inland waterways in the Gulf Coast region to service oil wells located in water.

The *201* is the first self-propelled barge ever to be equipped with oil well cementing facilities; and its launching marked the first adaptation to marine operations of the Halliburton method of handling cement in bulk instead of in sacks.

## Pennsylvania Agstone Group Discusses Lime Distribution

The Agricultural Limestone Division of the Pennsylvania Stone Producers Association sponsored a meeting of the Production & Marketing Branch of the Agricultural Adjustment Administration, on May 15, 1947, in the Hotel Penn-Harris, Harrisburg, Pa.

There were 65 persons present, with Clyde Zehner, state chairman of the Production & Marketing Administration, presiding.

Mr. Zehner explained the purpose of the meeting was to determine the relative merits of the contract plan and the purchase order plan for making liming materials available to the farmer. Clarence A. Kulp, chief of fieldmen's operations, of P.M.A., explained the contract system. Bruce H. Whitenight discussed the purchase order plan for the producers. Everett Felber, U. S. Department of Agriculture, P.M.A., Washington, D. C., summed up the advantages and disadvantages of each plan.

Immediately after lunch the discussion was thrown open to the producers. The chairman took a roll-call vote, which revealed that fourteen voted for the purchase order plan and fourteen voted for the contract system plan.

In closing, Mr. Zehner stated that he would make a study of the arguments which had been presented and that he would like an opportunity to give consideration to the tonnage supplied by each producer who voted for one plan, as against the tonnages supplied by producers voting for the other plan before making a decision.

## $30,000,000 Army Air Base To Be Built at Limestone, Me.

Residents of Limestone, Me., and environs are considering the manifold implications of the news that a $30,000,000 bomber base is to be constructed there for the United States Army Air Forces, a development described as "the most significant post-war development on our national defense."

The airbase will take in about 7,200 acres and will be equipped with facilities to accommodate 2,000 men. Army engineers have made preliminary plans, and work on the project was scheduled to begin about June 15.

## Robert E. Tobin Heads P.C.A. Office Reopened in Spokane

The Portland Cement Association has announced the reopening of its district office in Spokane, Wash., with Robert E. Tobin heading the staff. He will be responsible for association activities in eastern Washington and northern Idaho.

Mr. Tobin gained his early engineering training in irrigation and development work in Wyoming and was later employed by the federal Public Roads Administration in Yellowstone Park. During World War II he served as designing engineer for the Farragut Naval Training Station at Farragut, Ida. He is a former secretary of the Spokane section of the American Society of Civil Engineers.

## Modern Tug to Help Solve Marquette's Transport Problem at Oglesby Plant

Efforts of the Marquette Cement Manufacturing Company to overcome intermittent freight car shortages and meet current demands for Marquette cements are being facilitated by the delivery of additional marine equipment to its Water Transportation Division. The new 45-foot harbor boat *Little Dick* was placed in operation recently at the company's R. Moyle Dock at Oglesby, Ill., and a new towboat will be commissioned before the end of this summer to augment barging operations begun by Marquette in 1929. This equipment, specially designed to Marquette specifications, will enable more rapid loading and handling of an increased number of barges, according to V. A. Kogge, manager of the company's Water Transportation Division.

*Little Dick* is an all-welded-steel motor vessel with a 12-foot beam and a 3-foot draft. It is powered by a D-13000 "Caterpillar" marine-type diesel engine delivering 115 hp. at 900 r.p.m. A twin disc reduction gear of 1.96 to 1 ratio gives a propeller speed of 459 r.p.m. Full pilot house control is provided, with full instrument panel and manual controls for clutch and throttle. The vessel was built for Marquette by the Barbour Metal Boat Works of Valley Park, Mo.

This boat will operate at R. Moyle Dock, Oglesby, which is located at the mouth of the Vermilion River. Switching loaded and empty barges between the Illinois River and the dock will be its chief function.

The name *Little Dick* was suggested by reason of the fact that the boat will operate at the R. Moyle Dock, from which the much larger towing vessel *Richard Moyle* moves regularly. All were named in honor of R. Moyle Sr., who, at the Oglesby plant in 1893, produced the first barrel of cement made in Illinois. Mr. Moyle is today Marquette's vice-president in charge of operations and dean of all cement men actively engaged in production operations.

• Marquette's new harbor boat recently placed in operation on the Vermilion River.

## New Volume by R. H. Bogue Discusses Chemistry Of Portland Cement

A competently written, highly technical and well-organized book entitled *The Chemistry of Portland Cement* has just been released by the Reinhold Publishing Corp., New York. Author of the volume is Robert Herman Bogue, research director, Portland Cement Association Fellowship, National Bureau of Standards. Mr. Bogue is an authority on the subject, and has produced an excellent book, one which will be valuable both to cement chemists and to those persons who have an interest in the field.

The book is divided into three main parts; it has 30 chapters, and three appendices. Part I is called "The Chemistry of Clinker Formation," and embraces chapters 1-10. In this section chapter 1 is devoted to the history of the cement industry, with a resume of the important events leading to the development of the portland cement industry in Europe and in the United States. The subsequent nine chapters delve progressively into the chemistry of the clinker, dealing with such subjects as spectographic and petrographic analysis, reactions in the solid state, and equilibrium crystallization.

Part II deals with "The Phone Equilibria of Clinker Components," and is largely devoted to a technical discussion of the means and methods of high temperature phase research. The various elemental systems in the clinker (i.e.—"The System $CaO$-$Al_2O_3$-$SiO_2$") are given detailed treatment.

Part III (chapters 21-30) is titled "The Chemistry of Utilization," and deals with more everyday problems, such as heat of hydration, the setting and hardening of cement pastes, and tests for cement quality.

Appendices 1 and 2 deal with X-ray difraction patterns of clinker components and cement hydration products, while Appendix 3 lists equations for calculating phase composition of clinker.

The book contains both an author and a subject index, and is liberally illustrated with photographs, photomicrographs, electron micrographs, charts, and drawings. Price, ten dollars.

## Benson Named Aid to Head Of Genl. Crushed Stone Co.

Oscar E. Benson, vice-president of the Metropolitan Edison Company, has been named assistant to the president of the General Crushed Stone Company of Easton, Pa., according to an announcement made by Otho M. Graves, president.

Oscar E. Benson

Mr. Benson has been in charge of the York (Pa.) division of Metropolitan Edison. At one time he was manager of the Easton (Pa.) division of that firm. Previously he had been for many years operating superintendent of the New York State Gas and Electric Corporation.

Henry A. Huschke, managing director of the Agricultural Limestone Division, National Crushed Stone Association, has announced that two leaflets—*Agricultural Limestone* and *Repair and Rebuild with Limestone and Legumes*—are available to association members. The former may be obtained at $20 per thousand and the latter at $12.50 per thousand.

• Caterpillar diesel DW10 tractors pull the scrapers used for stripping in the quarry of Harry T. Campbell & Sons near Texas, Md. When the going gets rough, a Caterpillar diesel D8 tractor pushes the scrapers.

## British Industrial Leader Sees Promising Future For Refractory Industries

An encouraging report on the British refractory industry was presented to stockholders of General Refractories, Ltd., when Sir Ronald W. Matthews, chairman of that firm, recently stated that major progress had been made in 1946. He indicated that the company had done a record volume of business at home and also abroad.

Sir Ronald explained that the labor shortage had been compensated for by large-scale mechanization of the firm's facilities. He reported that Hargreaves and Jones, Ltd., Chelford, a subsidiary, was building a sand-washing plant for the purpose of supplying foundries with high-class washed and graded sand. He expressed the opinion that the industry in general has abundant reserves for many years ahead.

## Maine to Spend $38,000,000 On 2-Year Highway Budget

Maine's legislature has given final approval to a general highway fund budget totaling almost $38,000,000 for the two years ending June 30, 1949. Senator Harley D. Welch, chairman of the ways and bridges committee, estimated that revenue would total more than $31,000,000, including $21,500,000 from the state gasoline tax, increased from 4 to 6 cents a gallon.

The measure earmarked $11,625,000 for maintenance and betterments of state and state-aid highways, $3,358,000 for bond retirement, $3,400,000 for snow removal, $1,600,000 for state aid highway construction; $1,040,000 for the town road improvement fund, $1,625,000 for bridge construction, $880,000 for bridge maintenance, $418,000 for general administration, and $1,083,839 for state police administration. It also provided that an amount not to exceed $5,300,000 might be apportioned from the unappropriated general highway fund surplus in the next two years to match federal funds available under the federal highway act of 1944.

The bill increasing Maine's gasoline tax rate from 4 to 6 cents a gallon was signed into law on May 8 by Gov. Horace A. Hildreth.

Scheduled to go into effect June 1 and continuing three years, the tax increase will produce an estimated $3,500,000 a year in additional revenue for highway purposes. The bill was enacted with an emergency clause.

## New Owner Operating Pumice Plant at Laws, California

The Insulating Aggregates Company has put into operation its 70-ton pumice mill on property formerly operated by the California Quarries Company near Laws, Calif.

The plant is owned by G. M. M. Grant of Los Angeles. L. B. Eaton is in charge of operations, and F. L. Murphree is mill superintendent.

## WAA Offers War Plant And Town Site for Sale To Highest Bidder

Complete facilities for an entire industry, including a town, are being offered for sale or lease by War Assets Administration. Offered is the Gabbs, Nev., portion of the surplus Basic Magnesium, Inc., project, largest industrial enterprise in the state. It includes not only the townsite but also the largest known magnesite deposits in North America and a complete plant for the reduction of these mineral deposits to magnesium oxide and concentrate.

The property, used during the war to supply "feed" for conversion to metallic magnesium at the Henderson, Nev., plant (about 250 miles distant), provides approximately 4,990 acres of lode, placer and millsite claims. It cost the government about $8,500,000. The town itself consists of 60 two and three-bedroom frame houses, a staff hotel with 21 single and four double rooms, a 19-unit apartment building, a school, a recreation building and a fire station.

This unusual facility, WAA said, offers challenge and opportunity for development for peacetime purposes, for operation as a complete unit at the site. Magnesium oxide obtained from the deposits provides a basic material for the manufacture of oxychloride cements, refractory brick, chemicals and allied magnesium compounds, insulation and other building products. These deposits are economically mined through open-pit surface methods.

The main reduction plant consists of 11 steel-frame buildings with corrugated iron exterior walls and 14 wood frame structures. Complete milling equipment, 1,000 ton-capacity, includes crushers, classifiers, agitators, conveyors, flotation, filtering and calcining units, Herreshoff furnaces, bucket elevators, ore feeders, and drills. Ample water is supplied from wells. Power is obtained from the Southern California Power Company.

The project is located on state highway 23. Gabbs is connected with Luning, Nev., 32 miles distant, by a good paved highway. A branch of the Southern Pacific Railroad passes through Luning.

Proposals to buy or lease the Gabbs property must be submitted in quadruplicate on WAA bid forms and must be received at the WAA Office of Real Property Disposal, 1182 Market Street, San Francisco, Calif., by 10 a.m. (P.S.T.), July 1, 1947, where they will be publicly opened and read. Detailed information and particulars on bid procedure and credit arrangements may be obtained from the WAA San Francisco Regional Office.

## Nelson Reports High Demand For Lime in Latin America

Chemical lime is in great demand in Central and South America but these countries are almost 100 percent dependent upon imports, with prices ranging up to $3.50 per bag, according to Victor J. Nelson, head of the Victor J. Nelson Engineering & Construction Co., Burbank, Calif., who has returned from a 12,000-mile flight covering the countries to the south.

Mr. Nelson arranged for the installation of several Nelson No. 5 inclined furnaces for the calcination of lime while on the tour. Immediate installation of the furnaces is to be undertaken in the new plant of Tecnica Industrial Haedo at Buenos Aires and in a new government-operated lime plant at Port-au-Prince, Haiti. Another is scheduled for early installation at Santiago, Chile, under the supervision of Luis Morge Mira. Mr. Mira is also engineering the construction of a new Chilean cement plant.

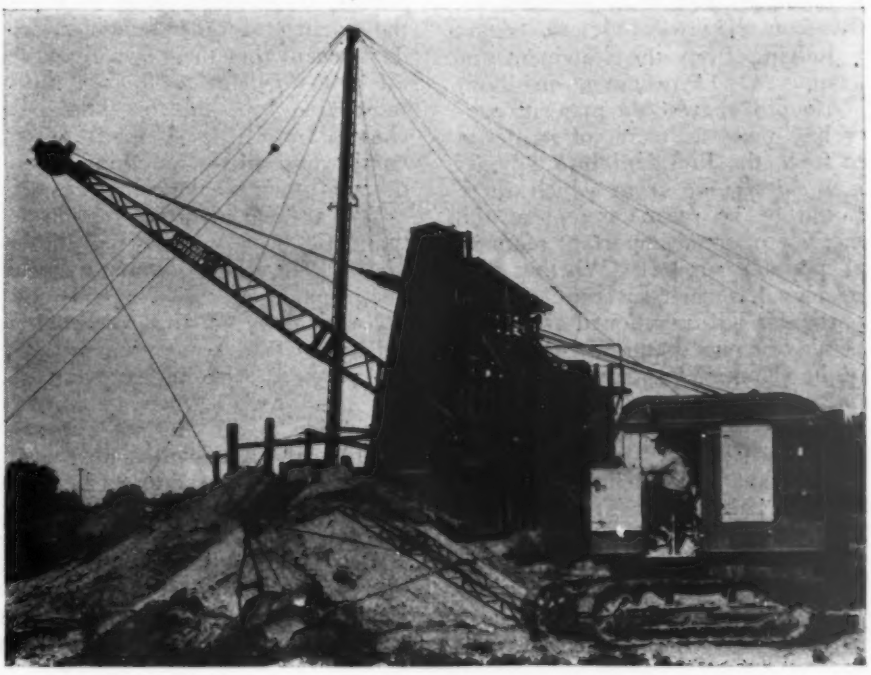
The flight was without mishap, reports Mr. Nelson, except for an anxious hour spent circling over an airport in Chile while the pilot labored to get the landing gear down.

## Hall Sand & Gravel Company Finds Work for Five Diesels

At the No. 1 plant of the Hall Sand & Gravel Company, 3657 South Natchez Street, Denver, operations continue up to 16 hours per day to keep Denver concrete mixers and concrete block factories humming.

International power in the form of three UD-9 diesel (53-hp. at 1500 r.p.m.) and two U-6 (41-hp. at 1500 r.p.m.) power units keep this No. 1 plant clicking at the rate of 500 tons per 10 hours of sand and rock in ¾-inch, 1½-inch and ⅜-inch sizes. One of the UD-9 diesels with starter operates the LS-50 Link Belt Speeder ½-cu.-yd. dragline shown which has a boom of 30 feet. Another UD-9 diesel operates the 8- by 36 Universal crusher, while one of the U-6's operates the conveyor and screens. The third UD-9 diesel operates a dragline hoist by a long cable line. The other U-6 is at the water line of a pond to pump water for washing the gravel.

• The dragline at work at the Hall plant.



## House Committee Urges Fifty Percent Cut in 1947 Farm Program Funds

Producers and users of agricultural limestone under the AAA program were rocked on their heels by the recent action of the House Appropriation Committee in recommending that funds for the 1947 program be cut to about half the amount promised by Congress last year. Pending ultimate passage of the appropriation bill, the Production and Marketing Administration has issued instructions to its entire field organization to suspend deliveries of agstone and other conservation materials.

Retention of the drastic cut would undoubtedly make it necessary to reduce the credit rates, requiring farmers to pay a considerably larger proportion of conservation costs. Another distinct possibility is that farmers who received materials during the first half of 1947 would be required to reimburse the government for the difference between the present credit rate and the new one.

## Diesel Engine Mfrs. Assn. Hold Meeting at Chicago

Advertising and public relations men employed by diesel engine manufacturers met in Chicago on April 21 in a session sponsored by the Diesel Engine Manufacturers Association.

The program was opened by E. J. Schwanhausser, vice-president of Worthington Pump and Machinery Corporation and president of D.E.M.A. Among the speakers were A. P. Colby, advertising manager of The National Supply Co., A. L. Davis, advertising manager for Worthington, H. H. Cohenour, Buda sales and advertising manager, H. J. Barbour of Fairbanks, Morse & Co., J. W. Vance of the International Harvester Company, and F. A. Uniack of General Motors, Cleveland Diesel Engine Division.

# WASHINGTON NEWS LETTER

BY the time this appears in print the President will have decided whether or not to exercise his veto on any or all of several pieces of highly controversial legislation which have been placed before him by an opposition Congress. Chief among these are the bills for reduction of taxes, restriction of labor and increase of rents. In every case, the proposed legislation runs directly counter to previous presidential recommendations.

Thus, less than half a year after mutual declarations of good intentions, the President and the Congress find themselves on opposite sides of some of the most crucial issues of the day, and the long pose of amicable cooperation has apparently by tacit consent been dropped.

In large part this new frankness has been necessitated by the increased consciousness in both political camps that the next presidential race is not far off, and that the trend of public opinion since the 1946 elections has been very much different from what was generally expected. To put it briefly the Democrats appear to have gained ground about as rapidly as the Republicans have lost it, and at a rate which few would have believed possible just a few short months ago. As one journalistic wit put it recently, referring to the undistinguished record rolled up by this Congress, "The Republicans seem to be wresting defeat from the jaws of victory."

Judging from the statements of leading G.O.P. figures in both houses of Congress, the majority party has made no secret of its desire to force the President into a political *cul de sac* from which there would be no escape except at the sacrifice of some important segment of popular support. Whether this strategy has been successful in the particular bills mentioned above depends of course upon how accurately the Congress has gauged the temper of the people. It also depends upon the astuteness of the President's own political high command, for no hat is as definitely in the ring for 1948 as Mr. Truman's, and political considerations are bound to have much more influence on his actions today than at any time since he first took office.

Thus far the major differences between the administration and the legislature have come over domestic issues. In the field of foreign policy, no serious rift has yet developed. Our economic policy toward other countries, especially the question of how much aid we should render them, has been hotly debated, but the President has generally had his way. Congress, for example, went along reluctantly on the request for $350,000,000 for relief supplies to help fill the gap left by the termination of UNRRA; but the important point is that the amount was finally voted in full.

But there are strong indications that the administration is getting ready to ask for a considerably larger sum with which to finance the looming dollar deficiencies of much of the rest of the world, and there is a growing feeling that this plan may precipitate a real showdown between the legislative and executive branches similar to the current fight on domestic problems.

In a recent speech retiring Undersecretary of State Dean Acheson stressed the extent and seriousness of the world's shortage of dollars. His figures showed that we are selling goods and services to the rest of the world at an annual rate of sixteen billion dollars. Other countries are earning roughly eight billion dollars by the sale of goods and services to us. And they are drawing down their meager holdings of dollars, or shipping gold to us, to the extent of another billion or two. This means that their own resources are not sufficient to finance much more than one-half of their purchases from the United States. Credits and gifts of one kind or another fill in the balance.

It is not expected that foreign demand for U. S. supplies will diminish in 1948. This country will still be the main source of outside supply for many of the commodities needed to feed populations abroad, and to speed economic recovery. At the same time, American imports of foreign goods are not expected to increase significantly next year, primarily because output in most countries will be restricted by lack of coal, materials, agricultural machinery and industrial equipment. If a steady flow of goods and services from the United States is to be maintained, therefore, the present rate of financial assistance must also be continued as a supplement to other means of payment.

However, under existing legislative authority, the volume of dollars available to foreign countries through gifts and loans is expected to start declining at about the end of this year. At the present time these sources provide upwards of six billion dollars annually, but a sharp drop is in sight. The new relief funds will not offset the curtailment of UNRRA assistance. The British loan is being used up much more rapidly than expected. The Export-Import Bank is near the limit of its lending authority, and all indications are that assistance from the international bank and the monetary fund will be on a much smaller scale than originally projected.

All this adds up to a sharp drop in the dollars available to foreign countries. For next year the drop in loans and relief is estimated at about 25 percent, and for the next year, at about 50 percent, from current levels. In the absence of new financial authority, foreign buying in this country would have to be curtailed. The cut in United States exports might not endanger American prosperity (though some lines might be severely affected), but it is felt by American officials that the impact abroad, especially in Europe, would be tragic. Reconstruction would be further slowed up, inadequate diets further reduced, and financial self-sufficiency delayed.

Secretary of State Marshall made his position on European reconstruction clear recently in a public statement which mirrored the official view of the administration. In that statement Marshall declared that the alternative to "substantial additional help" was "economic, social and political deterioration of a very grave character," and he left no doubt as to the desirability of our taking such a risk.

It is difficult to say now just what the reaction of an economy-minded congress will be to a proposal for further "substantial" assistance to other countries; but many observers are hoping that the upshot is not a jettisoning of the nonpartisan approach to foreign policy which seems to have worked fairly effectively to date.

# N. L. A. - OPERATORS' MEETING DRAWS RECORD ATTENDANCE

another ON THE SPOT report

THE National Lime Association held its 29th annual convention on May 5 and 6, 1947 at The Homestead, Hot Springs, Va. Following it on May 7 and 8 was the second meeting of the Operating

**By WALTER E. TRAUFFER**

Division of the Association. Preceding the conventions, on Sunday, May 4, the meetings of the board of directors and the executive committee were held. All meetings drew a record attendance, in spite of the fact that they were closed to other than member companies for the first time in years, and their programs were interesting and well balanced. The program of association entertainment was well planned and enjoyed by all and complemented the wide variety of recreation provided by this famous resort. The meeting also marked the full retirement from the affairs of the association of S. Walter Stauffer, for many years its president.

Robert S. Boynton, for the past year general manager of the association, was elected treasurer and general manager for the fiscal year 1947-48. Roma Medford Turpen was reelected secretary and Miss Gladys L. McBee, assistant secretary. Mrs. Turpen was absent from this meeting due to illness as was also K. L. Hammond, retiring chairman of the board of directors. The new chairman of the executive committee and president is H. D. Brigstocke. Following is a list of the members of the executive committee and of the board of directors.

## EXECUTIVE COMMITTEE

H. D. Brigstocke, vice-president (chairman), Thomasville Stone and Lime Co., Thomasville, Pa.; K. L. Hammond, secretary-treasurer, Keystone Lime Works, Inc., Keystone, Ala.; Wallace E. Wing, president, Marblehead Lime Co., Chicago Ill.; Bolton L. Corson, vice-president, G. & W. H. Corson, Inc., Plymouth Meeting, Pa.; Amos B. Miner, sales manager, National Gypsum Co., Buffalo, N. Y.; Reed C. Bye, vice-president, Warner Company, Philadelphia, Pa.; J. S. Offutt, merchandise manager, Industrial Gypsum and Lime, United States Gypsum Co., Chicago, Illinois.

## BOARD OF DIRECTORS

*District 1*—C. C. Loomis, New England Lime Co., Adams, Mass.

*District 2*—H. D. Brigstocke, Thomasville Stone and Lime Co.; E. D. Williams, H. E. Millard Lime and Stone Co.; B. L. Corson, G. &. W. H. Corson, Inc.

*District 3*—A. B. Miner, National Gypsum Co.; R. L. Dickey, The Kelley Island Lime & Transport Co.; Reed C. Bye, the Warner Company.

*District 4*— J. A. Dunaway, Peery Lime Company, Inc.

*District 5A*—Fred Witmer, The Ohio Hydrate & Supply Company; W. W. Sprague, National Mortar & Supply Co.

*District 5B*—Russell Rarey, The Marble Cliff Quarries Company.

*District 6*—L. N. Carmouche, The Dow Chemical Company.

*District 7*—W. E. Wing, Marblehead Lime Company.

*District 8*—C. E. Brady, Allwood Lime Company.

*District 9*—Henry La Liberte, Cutler-Magner Company.

*Districts 10-11*—K. L. Hammond, Keystone Lime Works, Inc.

*District 12*—Paul Sunderland, Ash Grove Lime & Portland Cement Co.

*District 13*—G. E. Robinson, Austin White Lime Company.

*District 14*—P. H. McMillin, Roche Harbor Lime & Cement Company.

*District 15*—Kennedy Ellsworth, United States Lime Products Corporation.

• Some of the directors of the National Lime Assn. Left to right: Wilfred W. Sprague, National Mortar & Supply Co., Pittsburgh, Pa.; Bolton L. Corson, G. & W. H. Corson, Inc., Plymouth Meeting, Pa.; Paul Sunderland, Ash Grove Lime & Portland Cement Co., Kansas City, Mo.; Wallace E. Wing, Marblehead Lime Co., Chicago, Ill.; C. C. Loomis, New England Lime Co., Adams, Mass.; Amos B. Miner, National Gypsum Co., Buffalo, N. Y.; Reed C. Bye, Warner Co., Philadelphia, Pa.; Russell Rarey, Marble Cliff Quarries Co., Columbus, O.; Henry La Liberte, Cutler-Magner Co., Duluth, Minn.; Fred Witmer, Ohio Hydrate & Supply Co., Woodville, O.; Ralph L. Dickey, Kelley Island Lime & Transport Co., Cleveland, O.; J. A. Dunaway, Peery Lime Co., Inc., North Tazewell, Va.

## OPENING SESSION

**General Manager's Report** At the opening session the usual minutes and reports were read. Mr. Boynton then briefly but thoroughly reviewed the important developments affecting the industry which had occurred since the annual meeting in 1946, particularly the passing of the OPA, the adoption by the A. S. T. M. of the specifications prepared by the lime association, the successful first operating meeting held last Fall, and the progress to date on the association's research program. According to Mr. Boynton the importance of the association's educational work is often overlooked but is now getting full attention. A growing number of inquiries is being received about the products of the industry, especially on agricultural lime, building lime and whitewash. Association literature, he said, is now being used in apprentice-training programs all over the country.

Mr. Boynton said that work is well under way on a book on the use of chemical lime in industry and that one on the use of lime on industrial wastes will come next. He also said that the study of market research on lime will be extended. There is a growing use for lime in highway stabilization and, he said, one large state could use 2½ times the present output of its lime plants for this purpose alone. A survey of this large potential market will be made.

## GENERAL SESSION

The general session was presided over by Henry La Liberte, president, Cutler-Magner Co., Duluth, Minn.

**Freight Car Shortage** "The Railroad Situation as it Exists Today" was the subject of a paper by W. C. Kendall, chairman, Car Service Assn. of American Railroads, Washington, which was presented in his absence by C. R. Megee of that association. The car shortage, it seems, is now worse than it was during the war. In the years 1923 through 1930 over 100,000 new cars were built annually. From 1931 through 1938 the figure was less than 25,000 annually. During the war car ownership dropped 600,000. To make matters worse freight car loadings in the first three months of this year were 8.1 percent over the same period last year. He predicted that loadings would continue to increase for various reasons. New cars are being built now at the rate of 4,000 per month while 5,000 are being retired and it will be late this year before the total of 1,700,000 usable cars will begin to increase. The biggest possible help now is the continued cooperation of shippers.

**Stream Pollution** In his paper "Lime — The Medicine for Stream Pollution," Edmund B. Besselievre, Advisor on Sanitation, The Dorr Co., New York, brought up to date a subject on which he had addressed the association in 1925. He first mentioned the several bills to curb stream pollution now before Congress and said that nearly every state now has such laws. Proper means fair to all can be found for handling any such wastes, most of which are harmful and very few beneficial. Each problem, he said, must be analyzed fairly and he described the various means of treatment now available, most of which use lime because it is cheap, safe and easy to handle. Patented compounds are usually more costly.

According to Mr. Besselievre, big strides have been made in this field since 1925 but there are now many more kinds of waste to be treated. We must develop the most economical treatments possible and in a few cases also salvage the wastes. The only disadvantage of lime now is the large amount of sludge created but a method of reclaiming the lime is now being perfected. A table was presented showing the various types of wastes which respond to lime. These ranged from tannery wastes which require 1 or 2 lb. to coffee bean wastes which require 300 lb. of lime per 1000 gal. for proper treatment. In closing Mr. Besselievre said that the lime industry must demonstrate the advantages of lime to users and show them how to use it.

**Water Softening** "German Water Conditioning Practices" were described by W. W. Cerna, Hall Laboratories, Inc., Pittsburgh, who was on one of the commissions sent over to study German methods. The Germans, he said, used methods much like ours for water softening, using similar machines and lime; only in softening very hot water are they ahead of us. In many cases, he said, the continuity of operation and the quality of product were considered to be more important than economy or capacity. As an interesting sidelight he said that traces of treated wastes in streams often pointed out hidden industries to our fliers.

**Chemical Lime Manufacture** Victor J. Azbe, president, Azbe Corp., St. Louis, spoke on "The Manufacture of Chemical Lime." Instead of a prepared paper Mr. Azbe used slides which he described as he went along. He told of the development of lime through the ages and gave some of the elementary facts about burning and slaking, and the development of the modern shaft kiln. He also commented on the fact that the United States is fortunate in having large supplies of good limestone. Other countries, including those in South America, are, he said, not so fortunate and the lack of suitable stone is holding back the development of their chemical industries.

## BUSINESS SESSION

In the absence of K. L. Hammond the business session was presided over by John M. Deely, Lee Lime Corp., Lee, Mass., who first paid a tribute to James H. McNamara, F. E. Bridgewater, and Samuel M. Shallcross, members who have passed on since the last meeting. Various committee reports were also presented.

**Safety Contest** An advance report was also given of the results of the 1946 National Lime Assn. Safety Competition, final statistics on which will soon be released by the U. S. Bureau of Mines. The Asbury plant of the Standard Lime & Stone Co. at Knoxville, Tenn., was the only one to complete the year without a lost-time accident. The Thornton, Ill., plant of the Marblehead Lime Co. also had no accidents but was not eligible for an award as it has no associated quarry. This rule has now been changed so that such a plant can win an award in a separate classification.

## RESEARCH SESSION

The research session was presided over by Professor Walter C. Voss, Head of Building Engineering and Construction, Massachusetts Institute of Technology, Cambridge, Mass. Professor Voss commented favorably on the recent research work done by the association as it has been fundamental and will provide an approach to the many problems with which the industry is confronted. He advised careful planning of future research and said that the various types of rock from which lime is made must be studied as each has different characteristics. Many types of science, he said, are needed in this

work, including mineralogy, crystallography, etc. The time has come when a tentative pattern must be set up for further research, this pattern to be adjustable to changing needs as these become apparent. He suggested that the association retain technical consultants to set up this plan in cooperation with its research committee.

**Sewage and Trade Wastes** Dr. William Rudolfs, professor, Department of Water Supply and Sewage Disposal, Rutgers University, New Brunswick, N. J., gave another report on the research work being done on sewage and trade wastes. Recent work has been largely on the treatment of pickling liquor where the volume of sludge created by treatment nearly equals the original volume of the liquor. He stated that the oxidation theory has been found to be sound and that a temperature of about 80 deg. C. has been found to give the greatest amount of neutralization and the lowest amount of sludge. With the time and temperature conditions known settling agents have been found to be most effective on dolomitic lime when the lime slurry is added slowly while the liquor is being stirred slowly. Best results are obtained with high-calcium lime when the lime is added slowly as the liquor is being stirred rapidly. The reasons for these reactions are not yet known. Dr. Rudolfs also mentioned other work being done for the association.

In describing other research work of interest to the lime industry which is being done independently Dr. Rudolfs mentioned odor control in industrial waste drying. The odor of tannery wastes, for example, has been reduced by 95 percent, and, he said, one plant alone uses 2 tons of hydrated lime daily for this purpose. The white water treatment for the reuse of paper board wastes is now in use in three plants.

In answer to questions Dr. Rudolfs said that soda ash is the most important competitor to lime for neutralizing purposes with caustic soda next. Lime is the most economical but soda ash makes the least sludge and it is important, therefore, to find means for decreasing the amount of lime sludge formed. For coagulation, he said, lime has no competitor and no other chemical neutralizes at the same time.

**Lime Research at M. I. T.** Howard R. Staley, associate professor of building construction, Massachusetts Institute of Technology, gave his annual report on the financial research fellowship of the associa-

H. D. Brigstocke, Thomasville Stone & Lime Co., Thomasville, Pa., the new president of the National Lime Assn.

tion. He said that various approaches are followed which are just beginning to give a general concept of lime. There is much room for improvement in the present methods of hydrating lime; proper wetting, for example, is of the utmost importance. It has been found, said Professor Staley, that in initial surface hydration adsorption takes place much more rapidly with soft- than hard-burned limes. Further interpretation of these findings is necessary in order to make them of practical value to the industry. Steam hydration, he said, produces lime not suitable for certain uses. In hydrating he emphasized that thorough wetting is important and that it is helpful to have uniform particle size gradation within certain limits. The problem varies with each lime but the research already done has shown that many of the desired characteristics can be obtained.

Professor Staley then described an instrument used for determining the porosity and pore structure of a lime which has been very helpful in this work. He also discussed the static from material in chutes which helps to cause clogging. It has been found, he said, that the coarsest particles have the highest charges and that high humidity helps to hold down static.

**Agricultural Research** Dr. Richard Bradfield, Head, Department of Agronomy, Cornell University, Ithaca, N. Y., gave a report on the agricultural research fellowship work at the New York Agricultural Experiment Station there. He said that New York in 1946 used 900,000 tons of liming materials, 60,000 tons more than in 1945 and an all-time high. Only about 2 percent of this total was burned lime. For reducing scab on potatoes he said that the lime should be applied to the soil long before the potatoes are planted and high-magnesian lime gives the best results. Orchardists, said Dr. Bradfield, are also becoming more interested in the use of dolomitic lime.

In New York State, said Dr. Bradfield, even the present high volume of liming material is only half of what is needed. The government subsidy, he said, has helped but the advantages of liming are so great that it need not be subsidized. He cited as examples the speed with which hybrid corn and certain weed sprays were adopted by farmers after their advantages were demonstrated and said that the advantages of liming were equally obvious and that it now is the major need of agriculture. Farmers are not yet fully convinced of the advantages of liming, said Dr. Bradfield, because some of them have not had uniform success or have had distribution difficulties. With spreader service now available and bulk lime costs lower the need is for improved methods of soil diagnosis so that the farmer can get definite results with every application and can see these results. We must know why a soil needs lime before we can use it intelligently. The preliming of soil 2 or 3 years ahead of the planting of a crop may be another reason why some farmers are not sold on lime as they like to see results at once.

**Mortar and Masonry Research** H. C. Plummer, Director, Engineering and Research, Structural Clay Products Institute, Washington, D. C., gave a report on mortars and masonry research at the National Bureau of Standards. He described some of the research under way or completed and said that nearly all commercial limes have been tested. These results show that a satisfactory performance test can be de-

vised for lime mortar and work is being done along this line.

**Lime in Castings** W. E. Mahin, Chairman, Metals Research, Armour Research Foundation, Chicago, read a paper on "Lime as an Investment Material in Ferrous Castings." This application of lime presents a possible new use in precision die casting by the lost wax method. Permanent molds are suitable only for metals melting at less than 1400 deg. F. and gypsum molds are good only up to 2000 deg. Lime is more stable than silica and has a high green and baked strength and Mr. Mahin suggested that it might pay to investigate the possibilities for its use.

## MEETING OF OPERATING DIVISION

The meeting of the operating division was opened on Wednesday, May 7, by Bolton L. Corson, chairman, who reviewed the successful first meeting held last year and said that this department has become a very important part of the association. Then he got things off to a good start with some of his best brand of humor, in this case the reading of a serio-comic "press release" of his address to the meeting.

## KILN SESSION

The session devoted to the discussion of kilns was presided over by H. M. Beatty, vice president, the Kelley Island Lime & Transport Co., Cleveland, Ohio. He first read the results of a questionnaire which had been sent out to the members to determine the popularity of various types of operating practices. The results are given in the following table which gives the total number answering each question and percentages.

**Refractories** The first paper at this session was on the subject of "Refractories" by W. F. Rochow, Harbison-Walker Co., Pittsburgh, Pa. He first briefly described the various types of refractories needed to stand up under the varying types of conditions found in different parts of kilns. This involves a transition from wear resistance to heat resistance as the material progresses through the kiln, but, he said, the biggest factor of action in the high-temperature zone is chemical. The removal of kiln rings is also very hard on the refractories in the hot zone.

A 95 percent silica brick, according to Mr. Rochow, is best for the hot zone of a rotary lime kiln because it does not react chemically with lime until it reaches a temperature of about 2900 deg. F., and it does not spall over the high-temperature range, as most of its expansion is at less than 1500 deg. He warned, however, that this brick expands very rapidly from 0 to 450 deg. F., and that therefore heating and cooling of the kiln between these temperatures must be done very slowly and carefully.

Clay brick, said Mr. Rochow, is used chiefly in the top sections of shaft kilns because of its low cost and resistance to abrasion. It is also used in the feed ends of rotary kilns for the same reason. It is, he said, practical up to about 2350 deg. F. This brick has an alumina content of about 40 percent, and there are other types containing up to 80 percent.

Mr. Rochow also described the corundum brick, containing 90 percent alumina, which is used for center-burner shaft kilns and rotary kilns, and the high-magnesia periclase which is used when a pure chemical lime is desired. He also described the manner in which steel plates are used to key brick into a rotary kiln, and the use of anchors at 90-deg. points in the kilns to prevent shifting. In answer to questions he said that the trend is definitely toward insulation of the kilns, chiefly to provide backing, and that this is now done to within 80 or 100 feet of the firing end.

In the spirited discussion which followed it was brought out that, in the cement industry some producers line their kilns with ½ inch of asbestos paper next to the shell at the hot end, but that this is done not for insulation, but to provide room for expansion to prevent spalling. A basic brick of high conductivity is used. One producer said that high-alumina brick in the insulated section far outlasted that in the uninsulated section. In vertical kilns one producer found that high-silica brick gave excellent results when burning dolomitic rock but that very poor results were obtained when burning high-calcium rock.

**Instrumentation and Automatic Control** "Instrumentation and Automatic control of Kilns" was the subject of a paper by John R. Green, Brown Instrument Co., Philadelphia, Pa. His complete paper is presented elsewhere in this issue.

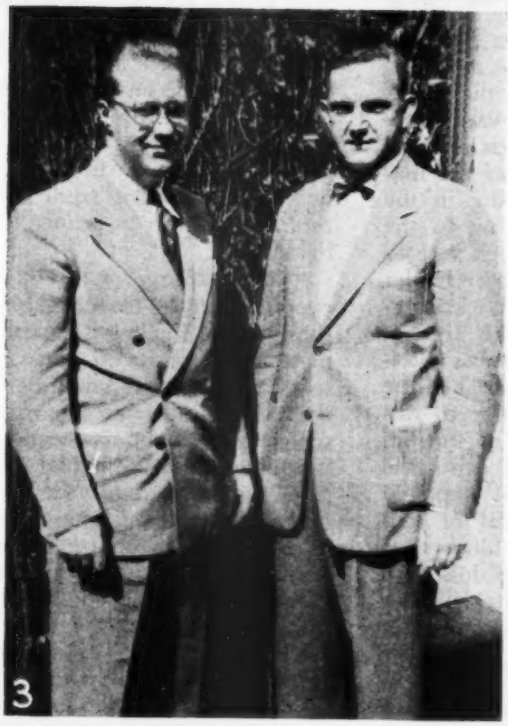
**Packaging** The Packaging Session of the operating meeting, presided over by Bolton L. Corson, featured a paper on "Packaging Problems in the Lime Industry" by H. S. Hangen, manager, Field Engineering Department, St. Regis Paper Co. Mr. Hangen first gave a rough picture of the difficulty of making any standardized ideal layouts of packaging systems for the lime industry because of the many

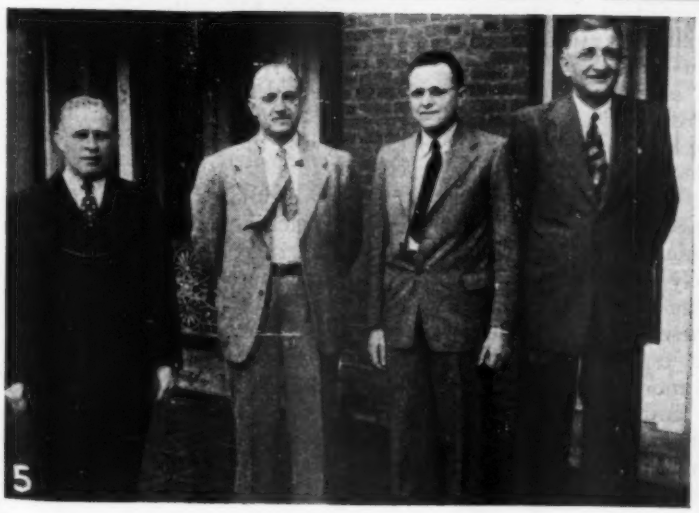
**N.L.A. OPERATING DIVISION QUESTIONNAIRE**

| Total No. Answers | | | | | | | |
|---|---|---|---|---|---|---|---|
| 39 | Source of Stone | 25=64% Quarry | 10=26% Mine | 4=10% Purchase | | | |
| 39 | Stripping by | 19=49% Shovel | 11=28% Scraper | 9=20% Other | 1=3% Crane | | |
| 42 | Drilling by | 15=36% Well | 19=45% Wagon | 8=19% Other | | | |
| 41 | Primary Blasting | 24=59% Standard | 16=39% Delay | 1=2% Primacord | | | |
| 33 | Secondary Breakage | 7=21% Drop Ball | 26=79% Pop Shot | | | | |
| 39 | Load with | 26=67% Shovel | 6=15% Loader | 7=18% Hand | | | |
| 42 | Transport by | 10=24% Rail | 23=55% Truck | 8=19% Conveyor | 1=2% Dumpster | | |
| 57 | Crusher | 19=33% Gyratory | 9=16% Roll | 5=9% Cone | 11=19% Hammer | 13=23% Jaw | |
| 49 | Screens | 12=24% Revolve | 26=53% Vibrator | 7=15% Shaker | 4=8% Hummer | | |
| 39 | Calciner | 19=49% Shaft | 11=28% Rotary | 7=18% Mod. Shaft | 2=5% Other | | |
| 30 | Hydrate | 28=93% Yes | 2=7% No | | | | |
| 71 | Bag | 23=32% Lime | 27=39% Hyd. | 21=29% Stone | | | |
| 47 | Bulk Ship | 28=60% Rail | 19=40% Truck | | | | |

Illustrations on opposite page:

1. In the foreground are Mr. and Mrs. E. D. Williams, H. E. Millard, Annville, Pa., with Dr. and Mrs. Montieth.
2. Mr. and Mrs. Roy F. Weston, Babcock & Wilcox Co., New York, N. Y.
3. Robert S. Boynton, treasurer and general manager of the National Lime Assn., and H. M. Beatty, Kelley Island Lime & Transport Co., Cleveland, O.
4. Left to right: Irving Warner, Warner Co., Philadelphia, Pa.; C. C. Loomis, New England Lime Co., Adams, Mass.; John R. Green, Brown Instrument Co., Philadelphia, Pa. and Carroll Stephens, U. S. Lime Products Corp., San Francisco, Calif.
5. Participants in the program were, left to right: Burton A. Ford and C. H. Hartman, St. Regis Sales Corp.; and George Leopold and H. S. Hangen, St. Regis Paper Co.
6. Left to right: Mr. and Mrs. E. Stanley Storey, North American Cement Corp., and Mr. and Mrs. Fred D. Witmer, Jr., Ohio Hydrate & Supply Co., Woodville, O.





variables involved. Among the variables are the characteristics of the lime produced which must be individually considered. Another consideration is the attitude of the industry, which is keenly sensitive to the need for clean and attractive bags.

According to Mr. Hangen everyone wants increased packaging output per hour with a corresponding reduction in cost. The only way to get these results, he said, is by appropriate installations of modern conveying equipment but belt conveyors cannot be substituted for hand removal of bags from machines to trucks without sacrificing some of the cleanliness inherent in this method.

In an attempt to find ways and means to improve the packing and loading of hydrated lime, said Mr. Hangen, five members of the St. Regis organization during the preceding 6 weeks observed the packing and loading operations of 12 lime plants in Ohio and Pennsylvania. The results of this survey are as follows:

"The greatest percentage of 3 and 4-tube 205-FL packers used for packing hydrated lime are installed under supply tanks that vary in capacity from 35 to 350 tons and over. The packing machines are installed in a manner that we term "floor setting," about 18 to 24 in. above the floor line. The majority of the machines are driven with 900- and 1200-r.p.m. direct-connected motors. This results in a full load speed of 860 and 1160 r.p.m. respectively. The packers in operation at the time of our plant visits were equipped with 1¼, 1⅜, and 1½ in. filling tubes and companion parts.

"After analyzing the production of the various packers equipped with the different types of filling tubes, we find that on packers equipped with 1¼ in. filling tubes and operated at 860 r.p.m. the average filling time for packing 50-lbs. varies from 11 to 13 seconds. At 1160 r.p.m. the filling time is reduced to 10 and 11 seconds. With the 1⅜ in. equipment at the same 1160 r.p.m. speed, the filling time averages from 7 to 8 seconds. When using the 1½ in. filling tubes at the same speed a further reduction in the filling time resulted, as our time study disclosed an average filling time of 5 to 6 seconds for 50-lbs.

"The hourly output when using two 3-tube 205-FL packers with a four-man crew averaged about 16 tons per hour, or 4 tons per man-hour. When two 4-tube packers and a 4-man crew were used the hourly output increased to 18 and 21 tons, or 4½ to 5¼ tons per man-hour. When using a three-man crew and two 4-tube packers, the output averaged from 16½ to 17½ tons per hour or 5½ to 5¾ tons per man-hour.

In operating two 4-tube packers with a 2-man crew the average output was about 12½ tons per hour or 6¼ tons per man hour.

"These production figures were based on all packers having the 1¼ in. tubes.

At one of the plants where the packing and loading was accomplished by one operator with a 3-tube 205-FL packer equipped with 1½ in. filling tubes, the average output was approximately 6 tons per hour.

"The average filling time quoted was established when the packers were being supplied with a sufficient amount of material to the housings. During the period when these machines were under observation we noticed that the output was reduced considerably on account of the material bridging and arching in the supply bins, or not coming to the packer bin at a fast enough rate to keep the packers supplied. Under this latter condition the packer impellers inflate the bag with air, necessitating in many instances oversized bags. Also, the material in the supply bins has a tendency to rathole through the center of the bin and when this condition exists the machines are again not supplied with an adequate amount of material which prolongs the filling time and reflects a production loss. All of these varying conditions will contribute to a decided variation in weights.

"The most important requirement in procuring the maximum packer output is to maintain a constant head of material over the packer. This provision will result in uniform filling time on all tubes and more accurate weights, and may result also in reducing bag size by virtue of the fact that less air is blown into the bag. Some of the most recent packer installations in the lime field provide a circulating system which keeps a relatively small bin over the packing machine filled to capacity. In observing these packers in operation, we noted especially that the filling time was more constant.

"Bin design and the amount of material in the surge bin above the packing machine are important. We have found in the packing of all types of portland cement that the capacity of the surge bin need not exceed ten or fifteen barrels. In the case of lime this capacity will have to be increased due to the differences in the nature of the material. The feeder installed between the large supply tank and the surge bin is driven with a gear head motor and a high and low bin-dicator is mounted on the surge bin which controls the operation of the feeder and keeps the level of the material in the surge bin between the high and the low bin-dicator points.

"Further, we cannot overlook the fact that the use of the proper size bag for each lime product is also essential and vitally important in maintaining uniform production and accurate weight results.

"It appears at the moment that the only solution to the problem of increased hourly output is in the installation of a 6-tube machine and woven wire conveyor belt. In that event the packing machine operator would travel back and forth in front of the machine on a roller seat. The 6-tube packer would be equipped with 1½ in. filling tubes, and with power or gravity discharge which will remove the bag from the filling tube without any assistance from the operator.

"The discharge of the bag would necessarily have to be delayed after the filling of the bag is completed, to permit the entrapped air in the bag to escape before discharging it. This we have found from our experience will require about six seconds which is equivalent to the actual minimum time required to fill the bag with 50 lbs. of hydrated lime. The length of the delay, of course, will be dependent on the characteristics of the material to be packed, but in packing hydrated lime, the delay would have to be at least six seconds. Our big problem with hydrated lime is to get rid of the entrapped air before we start filling the bag.

"The automatic features that we would incorporate in a 6-tube machine would limit the work of the packing machine operator to the placing of the bag on the filling tube.

"The estimated output of the 6-tube machine, with one operator, should average from 16 to 18 50-lb. bags per minute or 24 to 27 tons per hour. This is not unusual speed for one operator. On a 4-tube cement packer one operator is regularly handling 18 to 24 94½ lb. bags per minute. We believe that this output can be attained with a 3-man crew, especially if some of the car-loaders that are now available are employed."

Slides were then shown to illustrate several suggested packer layouts where designs are based on the

results of their survey. Suggested layouts were complete in every respect, providing for a lime storage bin, means for conveying and elevating to the packer bin, dust collector, dust reclaiming screw, and bag conveyor. Variations were made for various means of conveying the bulk lime such as screw conveyors and screw elevators, bulk flow conveyor, elevators, etc. One layout also showed the storage bin directly over the packer. The importance of two bin-level indicators, 10 to 12 in. apart, on the packer bin, was emphasized because of the necessity for a constant head and pressure in assuring uniform loaded-bag weights. Hydrated lime, said Mr. Hangen, loads best with about a 5-ton head. Baffles are used to prevent arching of lime in the bins and mechanical agitators can be used but never air as this must then be released from the loaded bags.

In the discussion which followed one producer said that in his plant bags are discharged on a belt conveyor but they are dusty and vary in weight. Another said that the use of a 1½-in. tube of greater than usual length gave the best results.

## LIME PLANT SESSION

This session was presided over by C. C. Loomis, president of the New England Lime Co., Adams, Mass. After commenting briefly on the need for better dust collection in the lime industry and some of the steps being made by his company in this direction Mr. Loomis introduced the first speaker.

**Dust Control** "Dust Control" was the subject of an illustrated talk by W. A. Van Allen, Ultrasonic Corp., Cambridge, Mass., after some introductory description of the work done for them by W. E. Wing and R. A. Temple, both of the Marblehead Lime Co. Mr. Van Allen described the manner in which his company is applying sound to the solution of various industrial problems. It is now being applied to a number of purposes such as dust collection, the speeding of aging processes such as the aging of bourbon whiskey from the raw stage to the equivalent of 4-year age in a few minutes, spray drying, improved waste gas heat exchanges, speeding up fluid catalyst systems for chemical industries, deflocculation to strengthen paper, oil cracking, sterilization, fog dissipation, etc.

The device used, a sound-wave generator, was illustrated and has the appearance of a souped-up siren. Early models had a capacity of only 200 watts of acoustic energy but this has been stepped up to 30 kilowatts and work is now under way on a 200-kw. unit. During the war the Navy used such a machine to dissipate fog and a pitch of 3500 cycles was found most effective for the 2 to 5-micron particles of fog.

• Left to right: Miss Gladys L. McBee, assistant secretary of the association, and Miss Jane C. Wojcik.

The relative motion of particles caused by the right sound frequency is the secret of this method, according to Mr. Van Allen, the differed speeds causing them to agglomerate. For each material the best intensity, frequency and length of exposure must be determined in order to get maximum results. Carbon black, he said, seems to be one of the most difficult materials to agglomerate and he described the first commercial dust collecting installation which was made to recover carbon black from stack gases. This installation collected 80 percent of the dust and another improved installation now going in is expected to collect 95 percent. A curve on a slide showed the percentage of recovery obtained with various sound frequencies.

Mr. Van Allen then described and illustrated a typical layout for collecting stack dust consisting of a collecting tank or agglomerator followed by a conventional cyclone and suction fan. He claimed that such an installation with an efficiency of up to 99 percent can be made at a much lower cost than the types of collectors now in use for micron material collection.

In answer to questions Mr. Van Allen said that a unit with 150-kw. input treats up to 50,000 c.f.m. of gases under average conditions. In some cases the addition of a water fog would increase the efficiency where a wet product is not objectionable. He also said that there is no particular advantage to removing coarse material first, through a cyclone or other means, unless it is in large quantities. The unit can also be used to prevent arching of material in bins and a small unit for this purpose may soon be developed. The sound made by this machine is almost inaudible to human ears but it drives birds away and kills some insects. Static charges in the dust might in some cases create a special problem.

Mr. Wing and Mr. Temple then went on to describe an installation of an American Air Filter Co. Rotoclone which they have completed to collect dust from hydrator stack gases. A sketch was shown which illustrated the method used for water level control and sludge removal.

**Elevators and Conveyors** Arthur C. Hewitt, chief engineer, Bellefonte Division, Warner Co., Philadelphia, Pa., next presented a paper on "Elevators and Conveyors." He first described some of the methods and equipment more or less standardized on in the plants under his jurisdiction such as geared-head motors on platforms at the tops of elevators, the use in most cases of malleable iron drive chains, cushion idlers at belt conveyor loading points, etc. He also went into some detail on the various reasons why belt conveyors may run off center, including the common fault of off-center loading. Where the alignment is off in the empty belt he said that it is usually due to uneven splicing. He advised marking a long centerline on both ends of the belt and then squaring it off and cutting it instead of the common practice of using a common square off one side of the belt which is usually not even. Cocking a few idlers forward will also help keep a belt in line and is far preferable, he said, to the use of side guide idlers. The statement was made that 1 degree of tilt in the direction of belt motion is enough and that more causes undue friction, belt wear and power consumption. A chart of the various types of conveyors and elevators used by the lime industry and the troubles often encountered with them was shown. There was also a graph of preferred head wheel speeds for centrifugal-discharge elevators.

In the discussion which followed it was brought out that in handling fine material in a bucket elevator the use of small holes, say 1½-in. in diameter in the sides of the buckets will let out air, permitting quicker

(*Continued on page* 80)

# Annual Convention of Industrial Sand Producers Biggest in N. I. S. A. History

another ON THE SPOT report

THE 12th annual meeting of the National Industrial Sand Association, held May 14, 15 and 16 at The Homestead, Hot Springs, Va., drew the largest attendance in the organization's history. Business sessions during the 3-day meeting were scheduled in the morning hours, leaving the afternoons free for the many outdoor pursuits afforded by the famous resort, and the members, many of whom were accompanied

**By WILLIAM M. AVERY**

by their wives and families, unanimously voted the gathering a huge success in this as well as in other respects.

Major subjects discussed during the business sessions included the car shortage problem, results of an industry-wide dust study, state industrial hygiene codes, and legislative enactments affecting workman's compensation insurance. A. Y. Gregory (Whitehead Brothers), G. A. Thornton (Ottawa Silica Co.), and Sterling Farmer (Sand Products Corp.) were unanimously reelected to the offices of president, vice president and treasurer of the association. J. S. Coxey, Jr., (Industrial Silica Corp.) was elected to the board of directors to fill the vacancy

• Their many friends were pleased to see Mr. and Mrs. George F. Pettinos Sr., after an absence of several years.

caused by the recent death of J. S. Cable (Minnesota Mining & Mfg. Co.).

**Supply Car** Caleb R. Megee, vice-chairman of the Car Service Division, Association of American Railroads, addressed the

• Informal luncheon gatherings during the three-day meeting of the National Industrial Sand Assn. took place on the Casino lawn at The Homestead, Hot Springs, Va.

first meeting on the car supply problem, presenting a brief analysis of the contributory factors and a somewhat gloomy picture of the immediate outlook. Seeds of the present shortage, according to Mr. Megee, were sowed in the 30's when railroads lacked both incentive and funds to purchase new equipment. During these lean years car replacements dropped to 23,000 units per year against a former average of 100,000 per year. The problem grew worse during the war years, when rigid allocation of materials made it impossible for railroads to keep up with retirements, and even in the past year there has been a drop in total car ownership.

Despite this steady decline in the number of cars available, total loadings in the first quarter of 1947 were higher than for any similar period since 1930, with ton-miles more than 7 percent above the 1946 level. For the next few months, Mr. Megee said, there is no prospect of a drop in the demand for equipment, although the railroads anticipate a leveling off in the loadings of certain commodities. With another record-breaking wheat crop in prospect, and with a continued high level of industrial activity throughout the nation, loadings for 1947 will very probably rise 8 to 10 percent above 1946.

Mr. Megee pointed out that the railroads are making every possible

• C. R. Wolf (National Pulverizing Co.), whose excellent movies of previous association gatherings provided one of the high spots in the entertainment program, was busy again with his camera.

effort to allocate available cars on an equitable basis. Worn out and obsolete cars, however, are still being retired at a higher rate than new cars are being constructed. At present, he said, about 99,000 cars are on order, and additional orders have been pledged for 44,000 new units. Some prospect of relief is seen in the steel industry's pledge to supply suf-

ficient steel for the construction of 10,000 cars per month after June, but it seems improbable that this rate of production will be achieved much before November.

Mr. Megee expressed the opinion that the essential needs of the national economy will be met this year despite the car shortage, but that the situation will call for general cooperation and understanding. Car users, he said, can help materially by loading and unloading cars as rapidly as posssible. According to the speaker, additional demurrage resulting from the wide-spread adoption of the 5-day work week will ultimately necessitate a 15 percent increase in the number of cars in service.

The railroads, Mr. Megee told his audience, want to get back to more strict enforcement of car service rules as soon as possible, since it has always been true that cars receive better treatment and are kept in better condition on home roads than on others. With the present car deficit, however, strict observance of the rules would put certain railroads out of business. He pointed out that it is now necessary, in order to compensate for the west-bound traffic deficit, to send 100 cars west each day regardless of ownership.

**Second Session** At the second business session, George A. Thornton (Ottawa Silica Co., Ottawa, Ill.) presided. A Warsaw (Wedron Silica Co., Chicago) reported that progress has been made on the Abrasive Blasting Manual, and that it will probably be completed in time for the association's October meeting. Stanton Walker, consulting engineer for the industrial sand group, discussed briefly an A. F. A. proposal for a secondary foundry sand specification. As drafted, Mr. Walker said, the proposed specification is objectionable because it sets up different limitations depending upon the type of sieving equipment used.

Hamilton Allport (Standard Silica Corp., Chicago) reported in some detail on recent labor contract negotiations in the Ottawa district. Despite union demands for six major changes in the former contract, which was the product of 28 months of negotiation, the recently-signed new contract was substantially like the old. An 8½-cent across-the-board increase in hourly wages was granted, and a provision inserted for reopening the wage question on August 1.

**Dust Study** Theodore F. Hatch (Industrial Hygiene Foundation) discussed some of the findings in the recent industry-wide dust

1. The Dwight Manleys and the Sterling Farmers were obviously pleased with life after the excellent dinner at the Cascades.
2. High spot of the social program was a steak barbecue at Cascades Park. We had trouble getting all the faces into this picture, but readers will recognize Vince Ahearn, executive secretary of the association, at the far end of the table.
3. The Hardy family (Hardy Sand Co.) of Evansville, Ind., relaxes after lunch at the Casino.
4. Left to right: Ted Waters (Association counsel), Mr. and Mrs. Alfred J. Miller (Whitehead Brothers Co.), Stanton Walker, N.S.G.A., and Theodore F. Hatch (Industrial Hygiene Foundation).

study, financed by the N. I. S. A. in an effort to determine all the factors involved in dust hazards. Mr. Hatch described some of the measures which can be adopted in dusty plants to reduce dust count to negligible levels, and he complimented the silica sand industry on having taken the first forthright step toward the ultimate elimination of the silicosis hazard.

**Hygiene Codes** At the third and final session of the meeting, J. J. Bloomfield (U. S. Public Health Service) discussed State industrial hygiene codes. Most compensation laws, according to this speaker, make no provision for the prevention of occupational diseases, and frequently no machinery is set up to administer the laws. Despite the tremendous growth in industrial hygiene activity during the past 10 or 12 years, 19 states are still without codes of any sort.

Great variations may be noted in existing codes, Mr. Bloomfield said, half of them setting mandatory limits on dust or other concentrations, and the other half merely recommending limits. Existing codes also leave much to be desired from the standpoint of uniformity, adequacy and administration, and many are out of gear with the essential aims and needs of industry. Mr. Bloomfield stressed the need for a more realistic approach in the drafting of future codes, and he pointed out the desirability of making careful and complete health survey before ordering industry to correct possibly hazardous conditions. This, he added, would prevent inadequate facts from being made the basis for enforcement.

An important ultimate goal, according to Mr. Bloomfield, is the development of a general hygiene code applicable to all industries, supplemented by detailed codes for specific industries.

**Compensation Legislation** Theodore C. Waters, association counsel, presented a two-part report dealing with legislative activities of the 1947 state legislative and the problem of compensation insurance rates. On the first named subject he disclosed that with the recent enactment of compensation statutes in Iowa, Nevada, South Dakota, Tennessee and Texas, occupational diseases are now compensable in 38 states. The Iowa law, which becomes effective October 1, 1947, provides a schedule of compensable diseases including silicosis with coverage for partial or total disability or death. Under the Nevada law, which becomes effective July 1, 1947, compensation is not payable for partial disability from silicosis. In the South Dakota law, also effective July 1, provision is made that in the event an employee has a non-disabling silicosis, or upon medical finding that it is inadvisable for him to continue employment, compensation may be allowed up to $1,000 upon discharge or termination of employment, this payment operating as a complete release of the employee from further liability. Both the Tennessee and the Texas laws provide schedules of compensable diseases including silicosis, with compensation payable for partial disability, total disability or death.

Mr. Waters referred to an amendment to the New York Occupational Disease Compensation Statute which may have an important effect on pending and future legislative activities in other states. The amendment, effective July 1, 1947, does away with the limitation of monetary liability so that an employee totally disabled or dying from silicosis will receive the same monetary benefits as though disability or death had been caused by accidental injury. The employer's liability, however, is limited to the payment of compensation for 260 weeks, and the Special Disability Fund, established under the New York law, becomes liable for the remainder.

**Insurance Rates** The second division of Mr. Waters report dealt with the results of a survey sent to member companies to develop specific information regarding compensation insurance rates. Six companies operating in New Jersey reported paying premiums on workmen's compensation insurance amounting to $21,866 in 1946, this amount including an overriding occupational disease charge. For the entire 5 year period from 1942 through 1946 there were no claims for silicosis compensation by any of the companies, and there were no common law suits.

In Michigan two companies reported without presenting detail as to occupational disease rates charged. During the 5-year period these companies paid total premiums amounting to $22,417, while the total compensation paid amounted to $3,500. There were no common law suits.

In all, 24 companies sent in reports, but in the majority of cases the information was too fragmentary to present a clear picture. Based on the information available, the current rates being charged in Ohio and West Virginia seem to be reasonable. Summarizing his report, Mr. Waters expressed the hope that at some future time the member companies will provide additional information on insurance rates so that the association will be in a better position to seek reductions if they are indicated.

**Ahearn's Report** Vincent P. Ahearn, executive secretary of the association, wound up the 3-day meeting with a discussion of some of the industry's current problems. He reported that member companies, replying to a survey sent out by the association, had disclosed costs ranging from as high as $20 to as low as $1 for cleaning and repairing railroad cars. Although the survey indicated general irritation over the car servicing problem, a majority of the companies indicated unwillingness to participate in any action before the I.C.C. This conclusion was confirmed by unanimous vote of those present at the meeting.

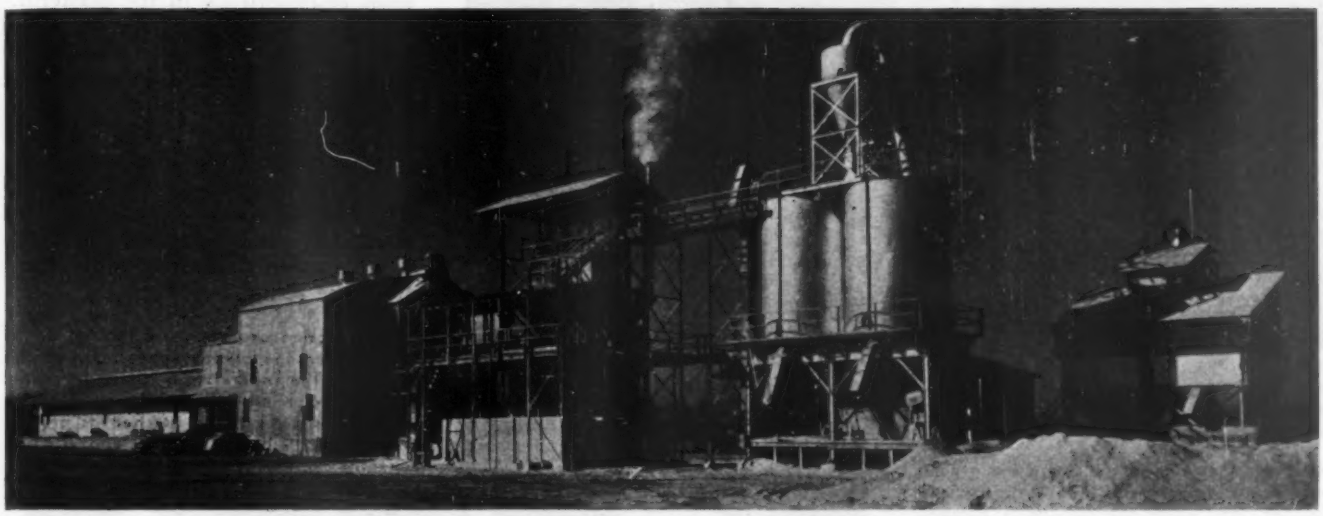
Mr. Ahearn discussed some of the features of the recently enacted Gwynne Bill, pointing out its great importance to mining industries in settling the portal-to-portal pay controversy. Generally speaking, he said, it is a good bill from industry's point of view.

A number of changes may be made in the wage and hour law, Mr. Ahearn said, and there is a definite possibility that the minimum wage will be increased from the present 40-cent figure to perhaps 65 cents. Industry in general, according to the speaker, has been much too casual with regard to provisions of the wage and hour law, and he urged his audience to give closer attention to the six tests, all of which must be met before an employee may be regarded as exempt from the law. Titles and payment even of high salaries may in some cases have little effect. In regard to the payment of bonuses and commissions, Mr. Ahearn pointed out that in some cases the employer may be required to recalculate wages back over the entire year for the purpose of determining overtime payments due.

Mr. Ahearn discussed some of the important features of the recent United States Steel Corp. settlement, and expressed the opinion that some of the provisions would eventually affect all branches of industry. In return for accepting a fairly nominal wage increase, the union obtained a number of concessions

(*Continued on page* 80)

# NEW $500,000 PHOENIX PLANT RELIEVES GYPSUM PRODUCTS SHORTAGE IN ARIZONA



• The Union Plaster Company's plant occupies several acres in a large new industrial area at Phoenix, Ariz. The building now includes offices, a modern laboratory and a warehouse. Additional equipment will soon be installed to further increase production of plaster and agricultural gypsum, in order to meet the increasing need for those products in Arizona and the Southwest.

ARIZONA'S plaster shortage has greatly decreased since the completion last August of the half-million dollar gypsum plant for the Union Plaster Co. in Phoenix. Serving Arizona and adjoining Southwestern states, the Union Plaster Company has reached capacity production of hardwall plaster and agricultural gypsum, and additional equipment is soon to be installed which will increase production even further.

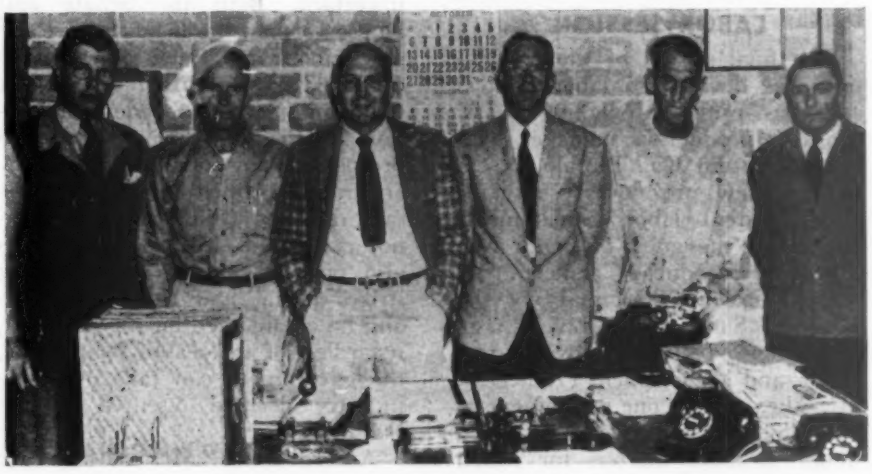
Union Plaster's large new processing plant occupies some 30 acres in one of Phoenix's recently developed industrial areas, served by all railroads and convenient to the transportation systems serving the city.

The Union Plaster Co. was incorporated in 1937 and immediately thereafter began exploratory studies of the various gypsum deposits in Arizona. Deposits near Winkleman, Arizona, were found to be best suited to needs of the firm, and property was acquired which contained in excess of 15,000,000 tons of raw gypsum. Further developments were held up during the war but upon termination of hostilities, construction of the plant was begun.

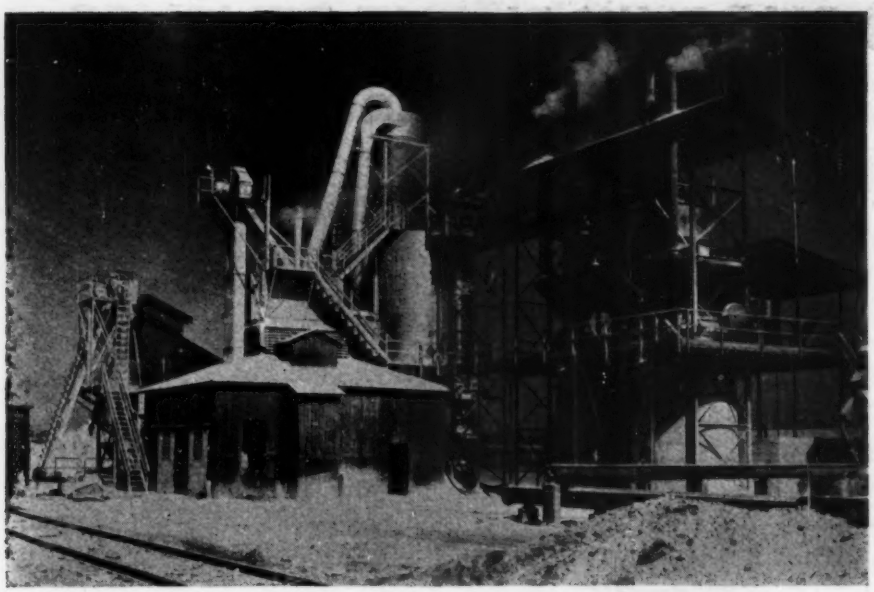
The raw gypsum is shipped in gondola bottom-dump cars from the quarry at Winkleman via the Southern Pacific Railway and is dumped into a 50 ton pit car receiving hopper.

The gypsum rock is then fed from the pit hopper by a 36-inch Link Belt feeder into a 24- by 34-inch Ehrsam primary jaw crusher. After crushing, the material is carried by a bucket elevator to the primary storage bins. From these bins, the gypsum is fed by gravity, with the aid of Syntron vibrators, onto a 30-inch belt, which feeds an 8- by 15-inch Wheeling secondary jaw crusher, which reduces the gypsum rock to approximately minus 1½ inches before it is fed to the 5-roll, low-side Raymond mill and cyclone. The pulverized material is air-separated into the Raymond cyclone and is carried upward by air currents to the raw storage bins. The material is then conveyed by a 14-inch Link Belt screw conveyor to two 8-inch Ehrsam calcining kettles. After calcination the material is dumped into the "hot pits." From these pits the stucco is carried by 14-inch Link Belt screw conveyors to a Stephens-Adamson enclosed bucket elevator, where it is elevated 35 feet to four steel "finish bins," which have a capacity in excess of 400 tons. The stucco is drawn from the finish bins by gravity into a screw conveyor, and discharged onto a vibrating screen. It then drops into an Ehrsam charging hopper and scale beam assembly, where the agents to control setting time are added. The product, now hardwall plaster, is dumped into an Ehrsam double barrel mixer, and carried by gravity to a 3-tube Bates packer.

In addition to various manufactured gypsum products, an agricultural gypsum is offered to the trade, either in bulk or sack form. The sacks contain 100 lbs. of air-separated gypsum of a fineness enabling it to pass through a 100-mesh screen. This special powder fineness permits the



• Officials of the Union Plaster Company. Left to right: Charles J. Reuscher, office manager; Buster Teague, chief chemist; Carlton M. Rogers, president; W. W. Alexander, chief engineer and assistant secretary-treasurer; Doyle Tate, mill foreman; Lamar Hicks, sales manager.



• Under the railroad tracks are the ground receiving hopper and the primary jaw crusher, into which the gypsum is dumped from gondola cars. The gypsum is then carried by conveyor belt (shown in the foreground, left) to the secondary crusher; from the crusher it goes to the mill where it is pulverized and air separated. The picture also shows the kettles in which the gypsum is calcined.

quick absorption by plant life of the gypsum values and field results are easily noted, particularly in irrigated areas.

The effectiveness of agricultural gypsum has created a tremendous demand for the mineral in Arizona and adjoining states, and the large production capacity of the Union Plaster Co. is expected to help satisfy the needs of the constantly growing market.

The president of the new firm is Carlton M. Rogers, who has been associated for many years with the manufacture of products used in housing. W. W. Alexander, engineer and secretary-treasurer, has had years of experience in the plastering industry and related fields. Lamar Hicks, sales manager, has been identified with the building material trades in Arizona for over a quarter of a century. Buster Teague, chief chemist, was formerly associated with the Pacific Portland Cement Co. of San Francisco. Charles Reuscher, office manager, joined the company shortly after his release from the Army.

• The sacking operation was moving at full speed when the photographer snapped this picture. The operator is sacking fibered plaster. Working three shifts a day, the Union Plaster Company reached its production goals some time ago.

## N.L.A.-Operators' Meeting

(*From page* 75)

loading and eliminating the vacuum which hinders discharge. The use of slower and larger elevators to give more loading and discharge time was also suggested.

### LABOR SESSION

The final session of the convention was devoted to labor matters and was presided over by F. A. Manske, production manager, National Gypsum Co., Buffalo, N. Y. After a few introductory remarks about current labor developments and about the guest of honor Mr. Manske introduced Vincent P. Ahearn, executive secretary of the National Sand and Gravel Assn. who discussed "Labor Laws, Agreements, and Management Privileges." Mr. Ahearn gave one of the general discussions of current legislation and trends in labor matters for which he has become noted but which, being current, would not at this late date give a true picture of all conditions as they now exist. He did say that labor legislation by Congress is certain but that the contents of the bill which will be passed is uncertain. Both the Senate and House versions, he believes, give the government too much power. He described as encouraging the fact that no one wants a Federal mediation board and that there is no prospect of any form of compulsory arbitration. Such arbitration, he said, does not avoid strikes and cannot exist in a free society. He is also opposed to any laws making strikes illegal and to labor courts and he commented on the fact that, regardless of the reason for a strike, the government can take over any industry deemed essential to the public welfare.

According to Mr. Ahearn we must make collective bargaining work and the public will tolerate neither continued labor strife nor unenforceable laws. He maintained that industry must live with the unions but should not get so close to them as to harm public interest.

## N.I.S.A. Convention

(*From page* 78)

of far-reaching importance, including the corporation's agreement to undertake a joint study of a broad social insurance program, to work out details of a plan which is to incorporate life, health and accident insurance and retirement benefits. Such a program, Mr. Ahearn pointed out, could eventually cost the corporation $75,000,000 annually, and he called particular attention to the fact that the purpose of the joint study clearly concerns a plan already accepted in principle.

# MEN OF THE INDUSTRY—20TH CENTURY HORATIO ALGER WINS FAME & FORTUNE

WITH construction under way on two sizeable portland cement plants on different continents, one in Corpus Christi, Tex., and the other in Venezuela, S. A., there has been considerable conjecture among the nonmetallic mineral "fraternities" about their owner and builder—Erle P. Halliburton.

His life story has much in common with the fabulous Horatio Alger yarns. Success did not come quickly or easily. His father died when Halliburton was 12 years old and the burden of supporting an older sister and four younger brothers fell upon the boy. He will tell you that he soon learned the value of an earned dollar. Speaking of this period of his youth, he says: "When I now look back upon these years of hardship, I realize that if we had had a paternalistic government such as we now have, and my mother had been willing to accept relief from the government, my whole philosophy of life might have been changed, and I would never have been able to serve my fellow man through industry."

When he was 14 years old Erle left his home in Ripley, Tenn. Successively, he worked as a locomotive engineer in a railway construction camp, a crane operator on the Mississippi, a sailor on a windjammer, an apprentice engineer and oiler on tramp steamers, and a salesman of automatic stokers in Brooklyn for the late W. D. Mayo, who later was chief engineer for Ford. Then he enlisted in the U. S. Navy. In July, 1915, his hitch in the Navy ended, and he went to work for the Dominguez Co. as superintendent of the distribution of water between Los Angeles and San Pedro.

His first contact with the oil industry was made in 1916, when he joined the staff of the Perkins Oil Well Cementing Co. "From my point of view, the two best things that ever happened to me in a business way were being hired and then fired by Perkins," he says.

After his dismissal from Perkins, he worked as a consulting engineer, and, in his spare time, developed an oil well cementing process of his own. In January, 1920, he filed his first patent application. Today, his patents number more than fifty.

When the lush oil field at Burkburnett was at its crest, Halliburton

Erle P. Halliburton, founder and head of the Halliburton industries.

tried to sell the oil companies on his cementing service, but they were skeptical. "On my first wells, I offered, among other things, to clear the well in case my project failed," he recalls. "My working capital was only $1,500, but I knew that, if given a chance to demonstrate, there would be no failure."

In December, 1919, W. G. Skelly, pioneer oil producer, gave the young man a chance to demonstrate the effectiveness of his process. Halliburton went to this first job by hired team and wagon. A borrowed cement pump, a tank, an old piece of clothesline for measuring depth, and a set of wood plugs were his sole equipment. Approximately 500 cloth sacks of cement had to be manually opened and poured by Halliburton.

As his process gradually gained acceptance, he found that manual mixing of cement in small batches was too slow and tedious. The limitations of the manual method were even more evident when it became necessary to control the amount of cement placed behind the well walls. Halliburton developed a jet mixer to solve this problem. One of these mixers is capable of mixing cement at a faster rate than that of an average ready-mix plant. By setting up two of these jet mixers, cement can be properly and continuously mixed at the remarkable speed of a thousand sacks every few minutes.

Discovery of new oil fields and a great demand for the Halliburton cementing service on a wider geographic spread necessitated a larger organization. On July 1, 1924, the Halliburton Oil Well Cementing Co. was incorporated under the laws of the State of Delaware.

From 56 employees at the time of incorporation, the Halliburton organization has been built into an institution of service with employees numbering over 3,000. Today, the HOWCO cementing service is available throughout the United States and in 36 other countries.

Besides the HOWCO subsidiaries in Canada and Venezuela, the Halliburton interests embrace a gold mine in Honduras, an aluminum luggage and furniture factory in Los Angeles, and a department store in Oklahoma City.

Today, with oil well drilling depths past 12,000 feet, producers find soft crumbling sands and terrific pressures of gas and steam

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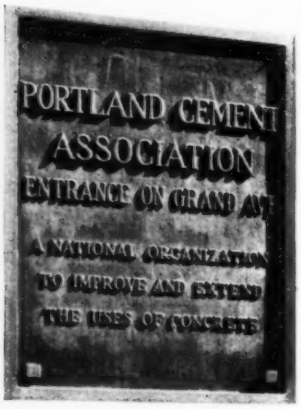



# The Portland Cement Assn. 45 Years of Outstanding Service to Industry

By WILLIAM M. AVERY

PROBABLY no single aspect of our country's industrial and business activity is more typically American than the hundreds of trade associations, both great and small, that have come into being during the past 50 years, and which today have an incalculably important effect upon our entire economy. In undertaking a study of the several trade associations which serve the pit and quarry industries, it seemed not only natural but inevitable that our attention should first gravitate to the Portland Cement Association, not alone because it is one of the oldest and most influential of the group, but because of the outstanding example it affords of what a relatively small industry can achieve through the medium of cooperative effort.

**History** The P. C. A. had its genesis back in 1902, when the total annual production of portland cement in the United States barely exceeded 17,000,000 bbls., and relatively little was known about the new construction material or its potentialities. In that year a small group of American cement manufacturers met in New York to discuss some of their common problems. The most tangible, and certainly the most far reaching and important result of that meeting was the formation of the "Association of Portland Cement Manufacturers." Two years later the name was changed to Association of American Portland Cement Manufacturers," and this designation was maintained until 1916, when the present Portland Cement Association was formed.

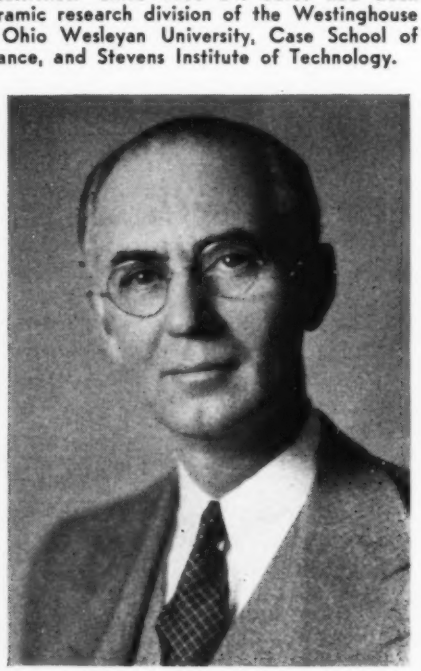
When the original association began functioning early in the century there were few precedents to guide it, and long-range promotion was unheard of. Even the manufacturers of portland cement knew relatively little about their material, and the users (what few there were) were for the most part completely uninformed regarding acceptable techniques and procedures. There was a very real danger that widespread misuse of portland cement might seriously undermine confidence in the new product as a construction material, and yet it was obviously prohibitive from a cost standpoint for each individual manufacturer to maintain a program of scientific research and education. In determining to pool its efforts and resources for a sustained program of research, development and expansion of markets, the young industry opened up trails which have since been followed by countless

Left to right, below—

• Frank T. Sheets, a nationally known highway engineer, has been president of the P.C.A. since September, 1947. He came with the association as consulting engineer in 1944, with a background of 12 years as chief highway engineer and superintendent of highways for the State of Illinois. He obtained his degree in civil engineering from the University of Illinois.

• William M. Kinney, vice-president, has been with the association since 1918, and served for a number of years as general manager. He was for a number of years engineer in the promotion bureau of the old Universal Portland Cement Co. Mr. Kinney received his mechanical engineering degree from Lewis Institute of Technology in 1906.

• Dr. A. Allan Bates, vice-president for research and development, is an outstanding scientist and chemical engineer with broad experience in industrial research. His appointment last year was announced in conjunction with plans for an immediate and marked expansion of the association's research and development activities. Since 1938 Dr. Bates had been manager of the chemical, metallurgical and ceramic research division of the Westinghouse Electric Corporation. He holds degrees from Ohio Wesleyan University, Case School of Applied Science, the University of Nancy, France, and Stevens Institute of Technology.



• The general office building of the Portland Cement Association, a five-story reinforced concrete structure located at 33 West Grand Avenue, Chicago, is the nerve center of activities which extend into every state in the Union.

others, and which have had a profound influence on the pattern of American life. The present high standards of technological information developed by private industry are in no small measure a result of standards originally established and adhered to by the P. C. A. in an era when broad public service by industry was virtually unheard of.

**Research** Judged by present day research standards the early research efforts of the original association were of necessity governed largely by expediency, for there was a pressing demand from the very start for immediate answers to problems which were encountered every day in concrete construction work. In spite of such pressure, however immediate steps were taken, in cooperation with the A.S.T.M., the A.S.C.E. and other technical organizations, to devise reliable and uniform methods of testing portland cement. Even such early undertakings as this established the groundwork for the sustained research program which was launched in 1916 when the present Portland Cement Association was organized.

In that year the general offices of the association were moved from Philadelphia to Chicago, and the new famous Structural Materials Research Laboratory was established at Lewis Institute of Technology in Chicago. To provide a basis for accurate scientific methods of proportioning concrete, this laboratory almost at once embarked on a monumental study of the laws of concrete mixtures. Out of this study, in the course of which about 100,000 tests were made, came what is now widely regarded as the greatest single contribution to the technology of concrete — the water-cement ratio law, which was set forth in Bulletin No. 1 entitled *Design of Concrete Mixtures,* published in 1918. By showing that the quantity of mixing water used, and setting up an accurate mathematical basis for proportioning, the water-cement ratio theory enabled builders for the first time to design mixtures for definite strengths and durabilities.

Even in its earliest activities, the P. C. A. brought to the American scene a startlingly new conception of the role which industry could play in the rendering of broad public service. The position was taken that

Left to right, below—

• W. D. M. Allan, director of promotion and manager of the advertising and publications bureau, has been on the association staff for the past 28 years. He is a graduate of Illinois Teachers College.

• F. R. McMillan, assistant to the vice-president for research and development, joined the association staff in 1924 as associate engineer. He was manager of the structural bureau from 1925 until 1927, when he became director of research. Mr. McMillan is a civil engineering graduate of the University of Minnesota.

• H. F. Gonnerman, director of research, joined the association's research staff in 1922 as associate engineer. He served as manager of the research laboratory until early this year, when his present appointment was announced. Mr. Gonnerman holds B.S. and M.S. degrees from the University of Illinois. He is a past president of the American Concrete Institute and an author of many papers and reports relating to concrete.

only by rendering service to users of cement could the association ultimately render the maximum service to its members. To carry out this objective it has been the policy to concentrate research efforts along lines that would be of immediate and practical use in concrete construction work, and to make all findings available as quickly as possible. Thus almost from the start the P. C. A. gained an enviable reputation for integrity, and won professional recognition from important engineering societies, leading technical schools and from the federal government.

Among the most valuable contributions to the construction industry have been the association's investigations of reported failures of concrete buildings and other structures. The policy of carrying out such investigations was adopted as early as 1907. In 1928 nationwide field surveys were instituted to correlate laboratory findings with actual field performance of concrete under various service conditions. In almost every instance it was found that failures resulted from poor construction practices, such as inadequate curing, poorly graded or dirty aggregate, poor joints, honeycombing or segregation. Instead of berating the construction industry for its shortcomings, the association jumped with typical energy and enthusiasm into the tremendous task of lifting the standards of construction practice, with the result that today structural concrete failures are virtually unheard of.

In connection with direct cement research one of the most important developments was the establishment in 1924 of the Portland Cement Association Fellowship at the National Bureau of Standards to investigate the constitution of portland cement and allied problems. Some 50 papers based on research data have been published by the Fellowship, and the work has revealed a vast fund of new information about the chemical reactions which take place during the burning of cement clinker. Many of the studies have been of immediate practical value in controlling and improving the quality of cement, and in disclosing what takes place during the hydration of portland cement.

**Policy** The P. C. A. takes no part, either directly or indirectly, in the sale or distribution of portland cement or in the commercial operations of its member companies. Its activities are designed wholly to promote and improve the uses of portland cement and concrete through scientific research, the development of new or improved methods and products, technical service to users as well as member companies and broad educative activities. Its entire program is financed by dues contributed by more than 65 cement manufacturers in the United States and Canada, who produce and market approximately 80 percent of all the cement used in both countries.

Participation in the association is on a wholly voluntary basis, and large member companies and small have an equal voice in the determination of policy. Despite the complete absence of leverage its present membership has been drawn from an industry which is today comprised of only some 83 companies scattered throughout 34 states. According to the Bureau of Mines report for the first half of 1946, these companies operated 154 mills, including two located in Puerto Rico. Only 11 of these plants were equipped to produce more than 3,000,000 bbls. annually, 21 fell into the bracket between 2,000,000 and 3,000,000 bbls., 80 were estimated to have a capacity of less than 2,000,000 bbls., and 42 of less than 1,000,000 barrels. Sixty-two of the companies operate only one plant, and only six operate five or more mills. The plants are estimated to represent a total capital investment somewhat in excess of $700,000,000, but a considerable number of the companies have investments of less than $3,000,000.

It is evident from these figures that the importance and wide influence of the portland cement industry in our economy is not a consequence of "bigness" as we measure it in America today. Portland cement has become the most widely used construction material to a very considerable extent because the manufacturers had the courage and foresight to pool their research and promotion efforts through the medium of a strong association, designed primarily to render a much-needed public service. That so much could be accomplished by a handful of scattered and relatively isolated companies is a strong indication indeed of the power of sustained cooperative effort.

Probably one of the most remarkable things about the P. C. A. is the persistence with which its many projects have been fought through to completion. It is the general history of trade associations that many of them make noble starts and die off in 15 or 20 years, largely because their major objectives are often not attained even after large expenditures of money and effort. The Portland Cement Association's enviable reputation for integrity, accuracy and reliability is in no small measure due to its sustained activity in the cement and concrete fields, and to the remarkable single-mindedness with which these activities have been directed to benefit the general public. The association is widely recognized as a national headquarters for every conceivable kind of technical service that might be required by users of cement in all fields, and it operates as a vast clearing house for the latest information on the making and use of concrete.

Typical of the long-range point of view which it has persistently adopted is the association's policy on patents. All patentable inventions resulting from research by members of the staff are immediately dedicated to public use without cost. In this manner improved methods of mixing and placing concrete and new applications of portland cement become immediately available to all who desire to make use of them.

**Organization** In its central headquarters building, a 5-story reinforced-concrete structure located at 33 West Grand Avenue, Chicago, the P. C. A. maintains a sizeable staff of engineers, chemists and physicists who are constantly engaged in advanced research and product development. Here, too, are located the seven promotion bureaus (Highways, Structural, Housing and Cement Products, Farm, Advertising & Publications, Soil-Cement and Conservation), each staffed by engineers who are specialists in their chosen fields. In addition to preparing and issuing technical reports and practical literature for use in the field, the vaious bureaus develop improved design and construction methods and translate research findings into practice. The bureaus are constantly in close touch with engineers, architects, contractors and other users of cement for the purpose of solving every imaginable type of problem arising in connection with concrete construction work. Modern physical and chemical research and testing laboratories are maintained at the headquarters building, and large-scale tests and studies are carried on in several field laboratories. These research activities are, of course, in addition to those of the staff of fellowship scientists at the National Bureau of Standards in Washington, D. C.

**District Offices** The association's 26 district offices, serving 44 states and the District of Columbia, are staffed by more than 200 field engineers experienced in road building, farm construction and diversified uses of concrete, who are competent to give local users of cement "on the spot" assistance in solving their problems. In all, the association offices receive, by personal calls, telephone, telegraph and mail, approximately 300,000 requests for information each year. All requests for information or assistance receive prompt attention, and when necessary specific jobs are visited by staff members. District office and general office employees of the association travel more than a million miles annually, providing for the construction industry a service that is without parallel in the annals of business enterprise.

**Concrete Pavements** The association's excellent work in the concrete paving field is a fairly typical example of the important public service which has resulted from many of its activities. When the original association was founded in 1902 there were only a few square yards of concrete pavement in the entire country, and what few crude specifications there were had been based primarily on modifications of those used in laying concrete sidewalks. The P. C. A. built experimental roads of its own, and assisted in financing similar projects in cooperation with federal, state, county and city officials. It conducted costly laboratory research projects, and coordinated these with field studies to determine if the principles evolved in the laboratory were applicable in service. The entire effort was trail blazing in the strictest sense, and the knowledge and experience accumulated during these early years played an important role in ushering in the automotive age.

By 1914 the mileage of concrete pavement was increasing so rapidly that the association was compelled to organize a separate road bureau to handle the countless demands for technical assistance. Two years later the Central Road Bureau became the largest unit of the organization, employing 125 men, most of them in the field. Research and development work in the paving field have been maintained at a high level down through the years, and it would be literally impossible to place a monetary value of the worth of this service to both the general public and the cement industry. It laid the groundwork for, the construction of the vast network of pavements which today comprises more than 100,000 miles of concrete highways, 33,000 miles of concrete streets and approximately 185,000,000 sq. yds. of concrete airport runways.

• The famous P.C.A. safety trophy is the symbol of an educational program in safety inaugurated in 1912. The trophy, presented each year to mills in which workers operate a full calendar year without accident, has been awarded to 137 plants in the industry. Many have won successive re-awards.

**Air-Entrained Concrete** An outstanding example of the important work of the P. C. A. in the pavement field was the development of air-entrained concrete, on which much of the basic research and testing work was carried out by members of the association's research staff working in close cooperation with highway engineers, cement technicians and others. Scaling of concrete pavements as a result of direct application of calcium chloride or rock salt to remove ice became a matter of serious concern in the middle 30's, and threatened to limit the construction of new concrete pavements in the northern states unless a solution could be found. Starting in 1935, more than 25 series of laboratory studies and some 20 experimental pavement projects were launched to find an answer to the scaling problem.

The first real clue resulted from the discovery that cores from experimental pavements laid by New York highway officials showed high resistance to freezing and thawing wherever one of two natural cements had been blended with portland cement. The other brand of natural cement appeared to have no effect upon durability. Laboratory analysis of the effective natural cement disclosed that it contained about 0.07 percent of fat or grease.

It was quickly discovered that the resistant slabs contained larger amounts of entrained air than the non-resistant slabs, and from that point on the project narrowed down to a fairly routine search for materials that would cause the entrainment of air. The first tests correlating freezing and thawing cycles with air content were reported by the P. C. A. in June, 1938. Portland cements containing small amounts of fatty or resinous materials are, of course, widely known and used today, with untold benefits not only in the paving field but in many other phases of concrete work.

**Educative Work** Happily the P. C. A.'s scientific research activities have always gone hand in hand with educative work and development activities, with the result that in the concrete field, more quickly than in any other with which we are familiar, today's theories become tomorrow's operating practices. In no other branch of modern industry is there so little lag between the laboratory and the field.

**Publications** In 1907, the association published its first official organ, the *Concrete Review,* which was mailed to engineers, architects, contractors, students, and others interested in concrete construction. Its immediate success led to the formation of a Publicity Committee, and soon an Information Bureau was set up to function under the direction of the committee. In 1917 *Concrete Highways Magazine* was launched, and over 400,000 copies were distributed in the first year of its publication. A year later *Concrete in Architecture and Engineering* (discontinued after 1921) and *Concrete Builder* were launched, and succeeding years were marked by the appearance of *Accident Prevention Magazine* (1927), *Architectural Concrete* (1934), *Concrete for Railways* (1937) and *R/C* (1940), a periodical devoted to technical aspects of reinforced concrete design and construction. The widely-known *Concrete Information Sheets,* covering a wide range of technical subjects, made their first appearance in 1935.

Some indication of the extent of the association's educative activities is suggested by these astonishing statistics: in the 10-year period from 1933 through 1942, 25,011,000 pieces of literature on more than 400 different subjects were distrib-

uted from the general office and the various district offices. In addition, more than 3,000,000 copies of the seven regularly-published magazines were distributed during this period. These technical publications and pamphlets, with their wide circulation, and backed by the experience and integrity of the association, have done much to raise standards of concrete construction work to their present high level.

**Development** For many years development work was in the hands of various bureaus and committees, but in 1933 Frank T. Sheets, then consulting engineer of the association (now president), was appointed Director of Development, and a definite program was outlined by the Board of Directors. One of the many outstanding contributions which have come from this department of the P. C. A. is the soil-cement method of constructing light-traffic roads, streets and airport pavements. Soil-cement attracted the attention of P. C. A. engineers as a possibly suitable paving material for some 2,000,000 miles of roads and streets on which traffic volume is too small to justify the use of concrete, and vigorous development activity was started in 1935.

Today soil-cement is a well-established construction material, and there are more than 2,000 miles of it in service on roads and streets, and more than 23,000,000 sq. yds. in airport runways, taxiways, and aprons. Soil-cement played an important role in this country's war effort, and the P. C. A. prepared special manuals and courses on the new technique for help in training some 10 divisions of the U. S. Engineer Corps.

Other techniques which originated wholly or in part in the P. C. A.'s Development Department include pressure grouting, the tilt-up method of building reinforced-concrete houses or industrial buildings, and various methods of producing color in concrete.

**Sand Library** Among the unique facilities which make it possible for the association to offer speedy technical assistance to cement users is its "Sand Library." This comprises a collection of some 3,000 specimens of fine and coarse aggregates from all parts of the United States and from a number of foreign countries. The specimens are kept in indexed containers, and in many instances performance records and petrographic and chemical analyses are available. When engineers desire to use local materials for concrete, it is often possible for the association to advise them immediately whether or not such materials are likely to make durable concrete.

The association's reference library, containing some 9,000 books relating to portland cement and concrete, is one of the most complete specialized libraries in the world. Also maintained is a completely indexed photographic library containing thousands of pictures of concrete structures in every stage of development.

**Safety Work** An extensive program of safety educational work inaugurated by the P. C. A. in 1912 has gradually made employment in cement plants one of the safest occupations in heavy industry. When the Accident Prevention Bureau was established in 1924, the cement industry was experiencing 35.3 disabling injuries per million man hours worked. By 1946 the figure had been reduced to 7.99, and the cement industry was credited by the National Safety Council with having the 6th best accident record among 40 industries studied.

The P. C. A. Safety Trophy, which is awarded each year to mills in which workers operate the full calendar year without a lost time accident, has to date been presented to 137 plants, many of which have won successive re-awards. Since the award was established, 65 mills have operated for 1,000 consecutive days or longer without accidents. In an industry which now employs some 30,000 men, exclusive of technicians and supervisors, the value of such an achievement in terms of human happiness is surely beyond appraisal. P. C. A. accident prevention and health activities have unquestionably saved the cement industry millions of dollars through the reduction of accidents, improved health and efficiency of employees and reduced insurance rates.

**Concrete Promotion** From the standpoint of strict accuracy the P. C. A. might better have been called the Portland Cement Concrete Association, for at least 90 percent of the time and effort of the staff is concerned with concrete rather than cement. This stems logically from recognition of the fact that there would be very little demand for portland cement unless there were first a market for concrete. Thus, while its member companies concentrate their efforts on the sale of cement, the P. C. A. channels most of its energies into the task of selling concrete and other cement uses.

**Competitive Materials** Wholly apart from the many complex technical problems which arise in connection with concrete construction work, there is a constant need for vigorous promotional activity, for concrete has more competitors than any other material in the construction field, and its competitors are not only well established but are alert and vigorous in their pursuit of markets. In the paving field asphalt, brick, granite block, wood block and tar are vigorously competitive, while in the structural field there are lumber, stone, steel, terra cotta, clay brick and tile, architectural glass and a constantly growing list of composition products.

Over a long period of years it is estimated that cement shipments in the United States are distributed among the major markets about as follows: structural, 28 percent; paving, 22 percent; housing and small uses, 22 percent; conservation, 16 percent and farm, 12 percent. On an average about 57 percent of total shipments are for concrete in highly competitive fields. In this connection a brief glance at the potential market for cement in a typical 5-story and basement office building is illuminating. Without promotional effort the cement industry could be certain of furnishing material for only the foundation, which might require 640 bbls. Floors and roofs, which are in the highly competitive category, might consume an additional 1,060 bbls. of cement, and the framework and walls (also highly competitive) another 1,060 bbls. Obviously, then, in a structure which affords a potential market for 2,760 bbls. of cement, only 640 bbls., or about 25 percent, can be regarded as over-the-transom business. The difference, amounting to more than 2,000 bbls., must be earned by alert promotion, intelligent technical service and the integrity of the product itself.

**Expansion of Markets** It would be virtually impossible to estimate in even the roundest numbers the extent to which the association has expanded the market for portland cement. The concrete road, street and alley pavement market alone has from the beginning consumed over 700,000,000 bbls. of cement. The new soil-cement market, which in 1937 consumed only

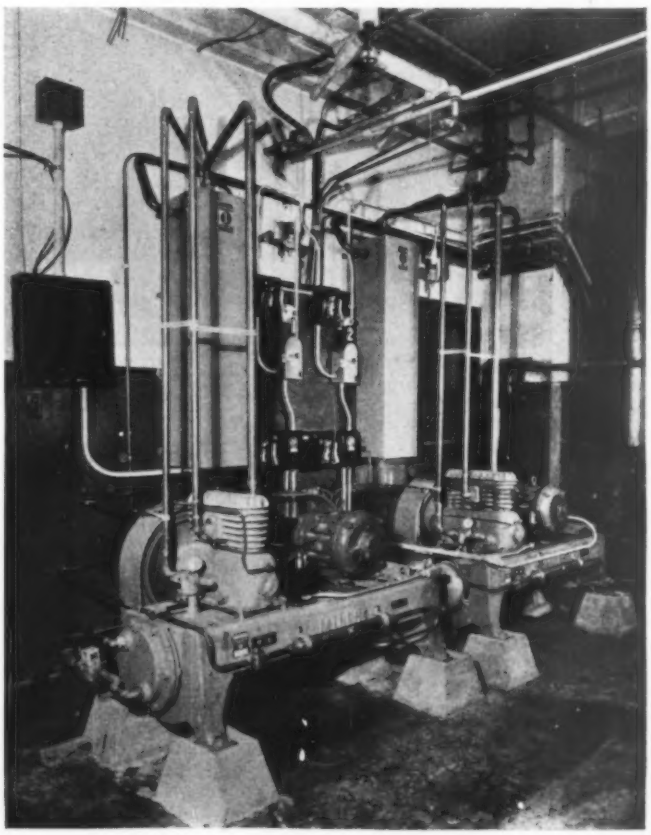
49,000 bbls., expanded to 1,500,000 bbls. in 1942, almost entirely as a result of promotional and development activity on the part of the association. The P. C. A. early recognized the tremendous potentialities of the concrete masonry market, and has channelled a vast amount of technical and promotional effort into its development. Largely as a result of such efforts the output of concrete masonry units has soared from 25,000,000 equivalents in 1933 to almost 1,000,000,000 in 1946, and the product itself has become firmly established and widely accepted as a high-grade structural material. The farm building market alone, in which the P. C. A. has for many years maintained vigorous activity, has an estimated investment value of $1,000,000,000 per year, an important part of which has been won for the cement and allied industries. During the war, in response to the critical need for substitute materials, the association developed concrete manhole frames and covers, drainage inlets, shower bath bases, sash weights, keel blocks, unreinforced burial vaults and similar items, many of which have found permanent markets.

**Allied Industries** Of the several allied industries which operate in the concrete field, one of the largest is the concrete products industry, numbering more than 3,000 plants and employing well over 100,000 men. About 1,000 ready-mixed concrete plants, employing more than 25,000 men, are estimated to be in operation at present. Some 400 plants engaged in the manufacture of concrete pipe employ approximately 30,000 men. In the rapidly-expanding precast-concrete joist field the number of operating units has soared from 20 plants in 1933 to 235 in 1941. These allied industries all benefit directly and materially from the activities of the P. C. A., and their several associations cooperate closely with the P. C. A. in respect to common objectives.

**Advertising Program** The P. C. A. advertises extensively in national publications and in local and farm papers. Through the medium of carefully-planned advertising programs the general public has been made keenly aware of the many structural advantages inherent in concrete.

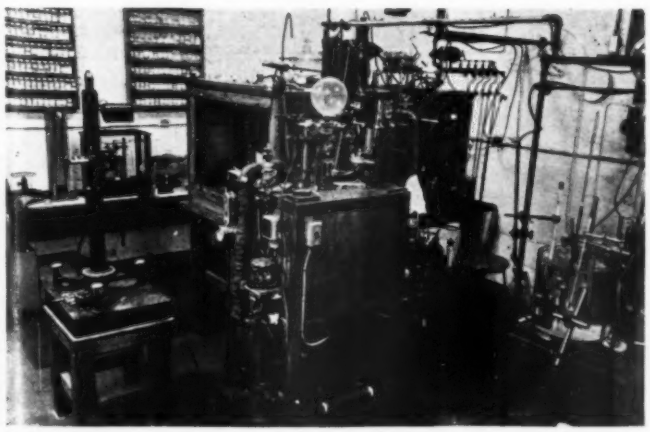
**Cost of Cement** Since 1900 the cost of portland cement to the user has remained consistently below the cost index of general construction, although the quality of the material has been steadily improved through constant research and development work. Although average hourly wages paid to cement plant workers in 1946 were more than double those paid in 1926, cement prices in 1946 were slightly less than the prices in 1926. Obviously the maintenance of low selling prices in the face of sharply rising costs would have been impossible without the steady expansion of markets and the vast increase in the industry's productive efficiency which have come about to a considerable extent as a result of the activities of the P. C. A. The monetary value of this service alone to the construction industry and the general public is beyond appraisal.

The P. C. A. has never been, and probably will never become, a static organization. Through two wars and several depressions it has shown a remarkable ability to tailor its activities to suit the current needs of the cement industry and the nation in general. Its functions and services have a natural tendency to expand as more things are learned about the the apparently limitless potentialities of portland cement concrete. Throughout its long history the P. C. A. has hewed close to the line of one major policy: to give prompt and wide circulation to all its findings, in order that pertinent data might be immediately applied to improve the quality of concrete in the field. Because of this, and because of the high technical standards which have characterized its work, the P. C. A. has in a very literal sense become a trusted public institution rather than the representative of a specific industry. In no other way could it have contributed so much to the general public welfare while actively fostering the interests of the portland cement industry.



• Left: A view in the association's physical chemistry laboratory, showing some of the equipment used in making vapor adsorption tests. The constant temperature cabinet in the background has a temperature variation of less than 1/100 of a degree.

• Right: Two 5-hp. Mills compressors recently installed in the basic research laboratory are used to produce the 15- to 20-degree below zero temperatures desired in carrying out durability tests on slabs. Kramer Trenton Thermbank units mounted on the wall effect automatic defrosting on a fixed time cycle.



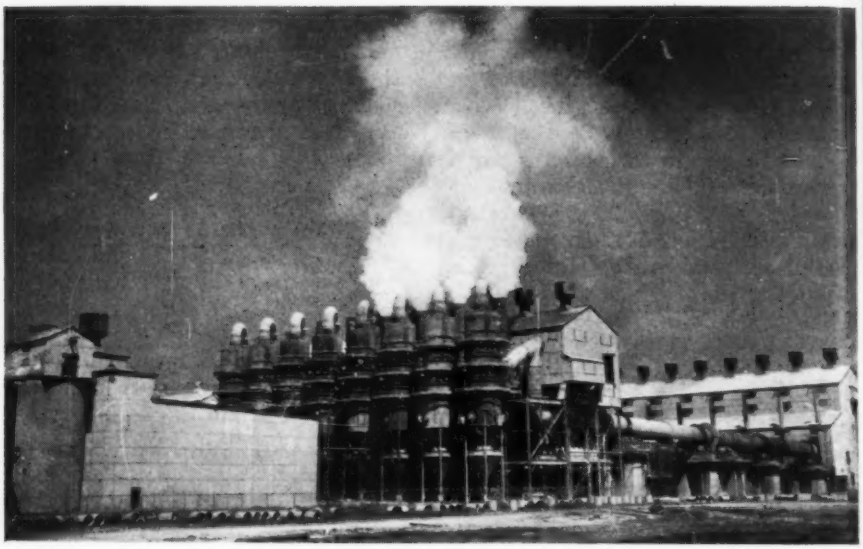
# IDEAL CONVERTS WARTIME SINTER PLANT TO PORTLAND CEMENT PRODUCTION

another ON THE SPOT report

DURING the war, at a time when the submarine menace seriously interfered with the importation of high-grade bauxite ore from South America, a sinter plant was erected at Mobile, Ala., by the Defense Plant Corporation. The purpose of this plant was to process low grade domestic ore, preparing it so that it could be handled by the Aluminum Ore Company's adjacent Bayer plant for the reduction of alumina. By the time the sinter plant was completed, however, the submarine menace no longer existed, and the plant was never used.

**By ROBERT W. SPAKE**

After the cessation of hostilities, the Ideal Cement Company found that its plans for expansion were being blocked by the nonavailability of kilns, motors, mills, etc., and after the inspection of several dormant defense plants, the company found that the Mobile plant contained exactly the equipment needed in their program. At the time, no thought was given to the production of cement at Mobile, and the purchase of the plant was made solely on the basis of dismantling the plant and shipping the machinery to other parts of the country. During preliminary investigations, however, it became apparent that there was a shortage of cement in the Mobile area and, when it was determined that raw materials were available, and that fuel, although costly, could also be obtained, an immediate effort was made to convert the plant to the production of cement.

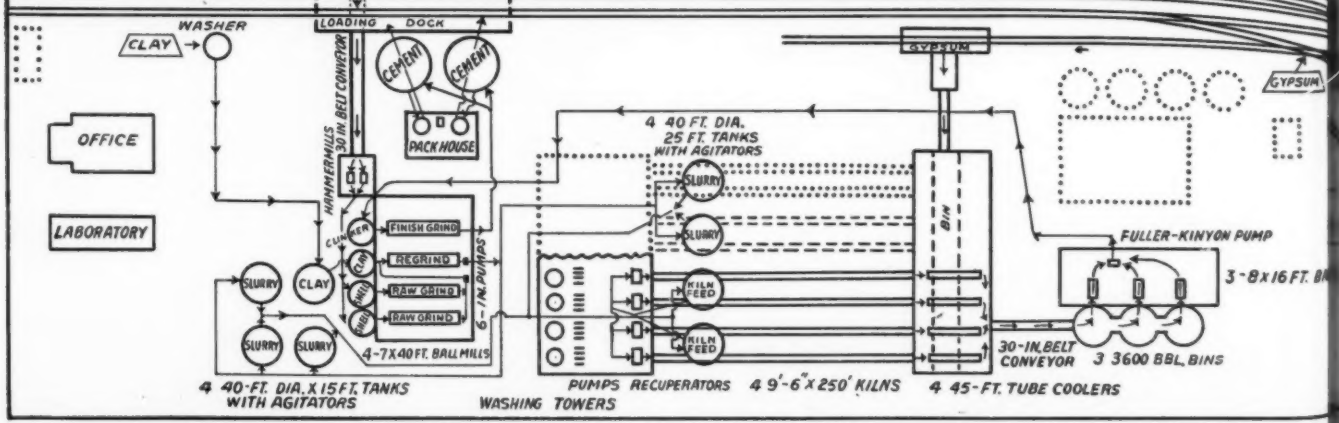


• A general view of the Mobile, Ala., plant of Ideal Cement Company, with washing towers exhausting cleaned kiln gas and steam.

Under the present plan, only two kilns will be removed from the Mobile plant. One of these will go to the Gulf Portland Cement Co. at Houston, Texas; the other to the Arkansas Portland Cement Co. at Okay, Ark. Additional grinding units will be installed at Houston, but present capacity will take care of the extra kiln at Okay.

Difficulties were encountered in converting this plant to the production of cement. For one thing, the original buildings were not weather proof. All machinery is of a type that can withstand weathering, but such cement installations as a packhouse obviously need cover. This defect has now largely been remedied. On the other hand, practically all of the machinery in the plant can be utilized. Only some filters and water cooling devices are not applicable to the manufacture of cement.

Shipments from the plant have been somewhat better than expected, and the company feels that they will be justified in continuing operations at the Mobile plant during the present period of demand. There is no way of telling, of course, how long this heavy demand for cement will last, and the modification program within the plant itself is being undertaken with this in mind.




• Map and flow sheet of the Mobile plant. Scale, approximately 1 inch to 200 feet. Buildings shown by dotted lines are existing structures not used in the production of cement. Kilns shown dotted have been removed; kilns shown in dashes will be used to produce lime. Flow indicated by arrows.

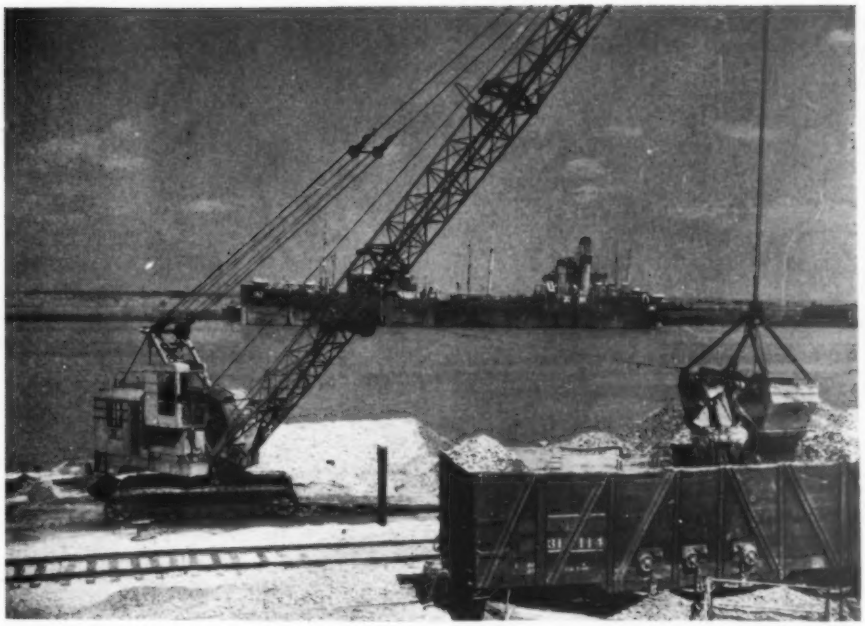
If the area develops sufficiently to require the continued operation of the plant, a considerably greater investment in storage and packing facilities will have to be made.

Those who are familiar with the production of cement will realize that there are a great number of difficulties to overcome in changing over a plant of this type, not weathertight, and which by its very nature was designed to accept shipments by rail from its landward side, and now receives its raw material by barge at the other end of the plant. Actually, if a large part of the plant could be picked up by some giant hand, and turned exactly around, a number of problems would be immediately solved.

As mentioned above, it is now necessary to unload raw material at the dock, place it in hopper cars, and shunt it the entire length of the plant before it can be ground. Once crushed and ground, the slurry must be pumped to one of five large tanks, only two of which are in a normal and convenient location.

Clinker handling, under the present arrangement, is a necessarily complicated bit of ingenuity involving an unusual amount of conveying and elevating before grinding. Once the clinker is ground it must be pumped almost the length of the plant again for finish grinding. That the plant produces cement at a reasonable cost is a tribute to the engineering skill and inventiveness of the men who supervised the changeover.

Under the present plan of operation, oyster shells are being used for raw material. These are dredged from old "dead" oyster beds in Mobile bay, and brought to the new wharf area by barge by an established local concern. Under an agreement recently concluded with the Alabama State Docks Commission, the state receives a guaranteed sum of $20,000 annually for the use of these dock facilities. The lease states that the Ideal Cement Company will pay the commission 10 cents a net ton on all raw materials shipped to the plant by water.



• A crane with a 2½-cu.-yd. bucket loads shell directly from a barge into a hopper car.

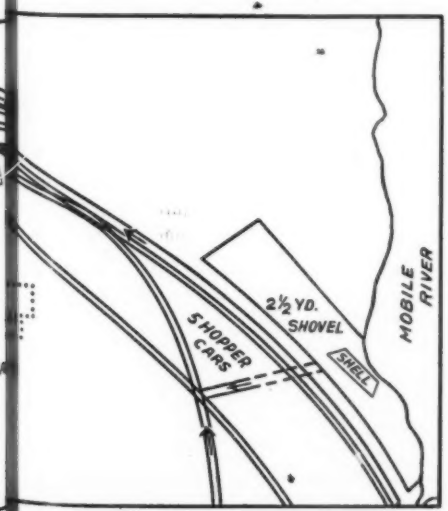
At the wharf the shells are unloaded into a stockpile by a P & H diesel crane with a 2½-cu. yd. clamshell bucket. This stockpile is placed over a tunnel which contained a 30-in. belt conveyor, powered by a General Electric motor through a speed reducer. The shells, which vary in size at this point from complete halves to crushed particles, are fed onto this belt by a Jeffrey vibrating feeder, and are discharged from the end of the belt above the ground either into hopper cars or into a stockpile. At present five hopper cars are used to carry the shell from the waterfront to the plant, a matter of perhaps a thousand yards. All hopper cars are company owned and are shunted back and forth by a 20-ton Whitcomb diesel locomotive. Gypsum, brought in by boxcar, is unloaded into a track hopper or stockpiled near the plant. Clay is brought in by barge and trucked to the land end of the plant, where it is picked up by an orange peel bucket on a track mounted crane, and placed in a plant constructed washer. It is pumped, with water, from this washer to one of the 40 by 25-ft. storage bins west of the preliminary grinding building. Before use it is pumped into one of the four 240-cu. ft. bins in the building.

At the other end of the plant, where the original inflow of raw materials was planned, the hopper cars dump into a below tracks surge bin, which feeds a 30-in. belt conveyor in a tunnel. This belt carries the oyster shells to a position above two Dixie 5040 hammermills. A split chute, equipped with Syntron electric vibrators to prevent bridging and clogging, divides the raw shell between the two hammermills. The crushed shell is not screened, but is picked up below these mills by a short belt conveyor and carried into a Stephens-Adamson bucket elevator. This brings the material up to a 24-in. belt conveyor, and it is then carried to two more of the

• Chutes carrying raw shell to the hammermills for primary crushing.

240-cu. yd. surge bins above the fine grinding building. The fine particles of shell drop from the bottom of these bins onto a Jeffrey vibrating feeder and a short length of 24-in. conveyor.

At this point water is added with the crushed shell, and the slurry



goes into one of two 7- by 40-ft. Traylor three-compartment ball mills for preliminary grinding. When the slurry leaves these two mills, the two discharges are blended together and enter a third 7- by 40-ft. mill for regrinding. Clay is added with this feed, and the two materials are ground together in this three-compartment mill, which is powered, as are the others, by Electric Machinery Corp. 700 hp., 4160 v. AC synchronous motors. Two Morris 6-in. slurry pumps, with Louis Allis motors, then pump the slurry to one of five tanks. Two of these tanks are 40-ft. in diameter and 15-ft. high, and the other three are 40-ft. in diameter and 25-ft. high. All of these tanks are equipped with Dorr agitators. Dip samples are taken here to permit the plant chemists to regulate the constituents and quality of the slurry and cement.

As the slurry is needed for kiln feed, it is pumped alternately to two other 40-ft. diameter by 15-ft. high blending tanks. As one is emptied the other is filled. Slurry pumped from the full tank goes up to surge tanks in the building above the feed ends of the kilns. Ferris wheel feeders dip from these surge tanks, which are in a closed overflow circuit with the main kiln feed slurry tanks. These feeders put the slurry into Traylor Colton-Lang evaporators (which are serving as recuperators) which use waste heat from the kilns to thicken the slurry before it is burned.

After the kiln gases have passed through this system they are introduced into washing towers, where water sprays remove the dust. The gas is then released into the atmosphere; and the dust settles as a slurry in the bottom of the tower, to be drawn off periodically through a goose neck and reintroduced into the recuperators. Excess water is drawn from the top of the water column, and recirculated by Ingersoll-Rand centrifugal water pumps. Kiln gases can also be released directly into the air without washing if desired.

A drag chain is used to pull the thickened slurry from the recuperators into Link-Belt screw conveyors which feed the kilns. These are Traylor 250-ft. by 9-ft. 6-in., powered by 100 hp. General Electric weatherproof motors, and are driven through Westinghouse speed reducers. At high speed, they turn once in sixty-eight seconds. Six of the kilns are being left in place at Mobile, one has already been shipped to another Ideal plant, and the eighth is now being dismantled. All kilns have been relined (with 70 percent brick and magnesite brick in the burning zone, replacing the 40 percent brick that would have been used in the sintering process). Special brick were cut on the job, using a Clipper masonry saw.

An air motor is permanently mounted on each kiln so that they may continue to revolve in case of an electric power failure. Three and one-half to four hours of slow speed turning would be necessary to prevent warping of the shell. Air for these motors would be supplied by a large gasoline motor powered compressor.

M. O. Matthews, vice-president and general manager of the Southern Division, Ideal Cement Co.

The kilns are natural gas fired, and have an emergency cutoff built into the fuel system that will automatically shut off the gas if the forced draft pressure or the induced draft vacuum falls below a preset point. This will prevent a flashback of kiln gases at the discharge end of the kiln.

Babcock and Wilcox unit mills for pulverizing coal are installed as standby equipment, and could be put into operation on short notice if natural gas supplies should diminish or be cut off. However, coal is not stockpiled.

The clinker drops from the end of each kiln to an individual 8-ft. 3-in. by 45-ft. Traylor tube cooler, which discharges a clinker cool enough to hold in the hand. A Pangborn dust collector collects the dust from this and other operations in this building.

The clinker comes from the coolers and is discharged into one of the two below the floor Link-Belt Peck carriers. This carrier elevates the clinker to what was formerly the overhead coal bunker—now used as clinker storage. Clinker is fed from these bins over a Schaffer Poidometer and into the second below-the-floor Link-Belt Peck carrier. At the same time, gypsum, stored in one end of the same bin, is fed across another Poidometer into the second carrier. This elevates both materials to the top of the building again, and discharges them on one of two Tyler Hummer screens carrying 5/8-in. screen cloth. Material passing through this screen drops onto a 30-in. belt conveyor and travels overhead in an enclosed flight to the fine grinding department. Oversize from the screen is put through a Traylor TY 1-ft. 8-in. gyratory crusher with a 3/8-in. closed side opening. This discharges into the second Peck carrier, thus making the crusher in closed circuit with the screen.

In the fine grinding department, the clinker drops into one of three 3600 bbl. bins, and then into one of three 8- by 16-ft. two compartment Traylor ball mills. These mills are powered by Electric Machinery Co., 450 hp. 4160 v. synchronous motors, which perform the preliminary clinker grinding. Fuller-Kinyon pumps (6-in.) move the ground clinker back to a 240-cu. yd. surge bin in the building containing the three 7- by 40-ft. three compartment raw grinding mills. There a fourth such mill is used for final grinding of the cement.

Fuller-Kinyon pumps take the cement to the conventional style packhouse, where it is stored in two bins originally intended for soda ash, having a capacity of 34,000 bbls. of cement. Cement is fed from the bottom of these bins by a screw con-

1. An electric vibrating feeder delivering shell from the bin (top right) to the short belt (bottom) which takes the material to the mills for preliminary grinding.

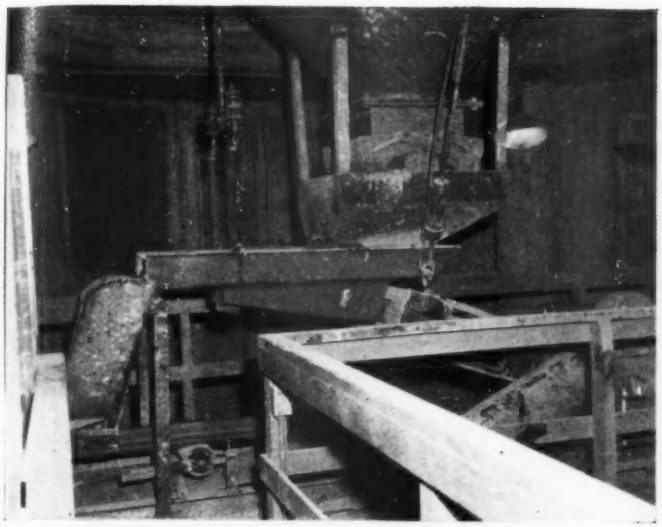
2. A synchronous motor (right) drives the 7- by 40-ft. ball mill (left).

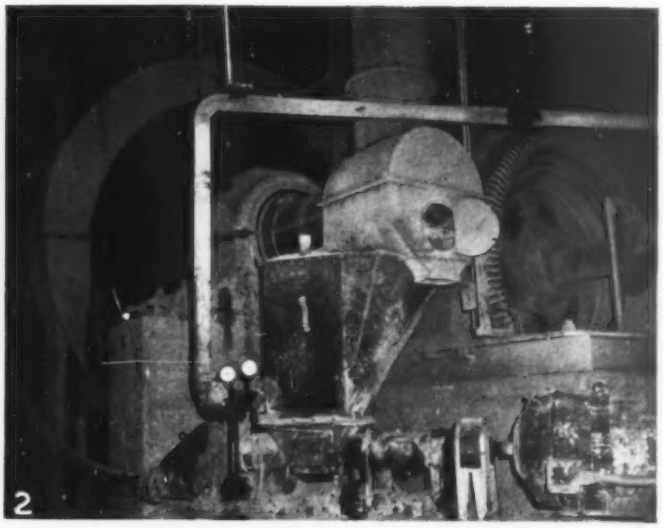
3. Looking down on a centrifugal slurry pump in the preliminary grinding building.

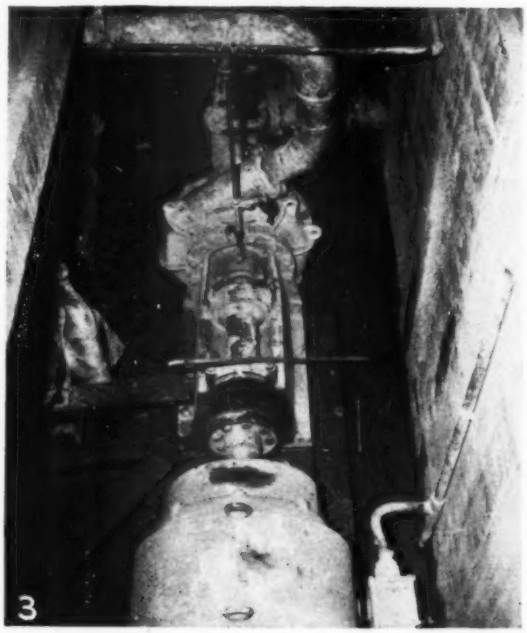
4. One of the evaporators which serve as recuperators, utilizing waste heat to thicken the kiln feed slurry.

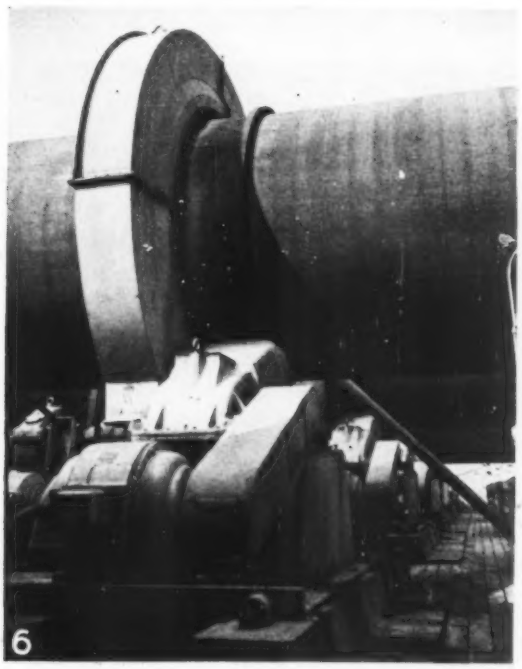
5. The four 4½- by 250-ft. kilns which are producing cement. Clinker is stored in a bin on a level with the windows in the building shown.

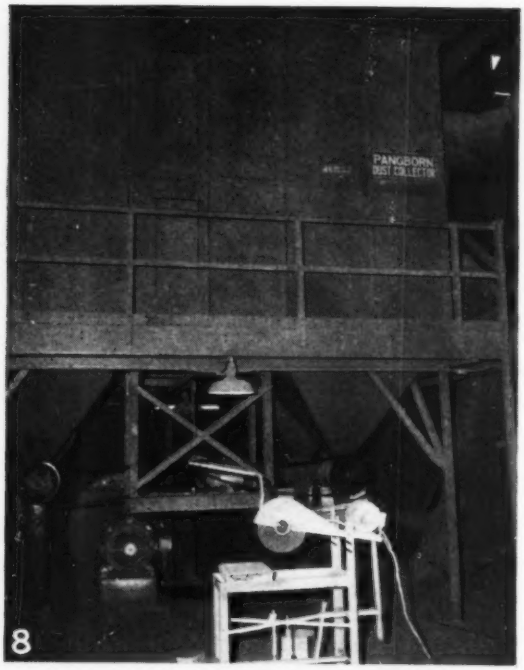
6. The motors and speed reducers that drive the kilns. An air motor for emergency use is shown at far left.

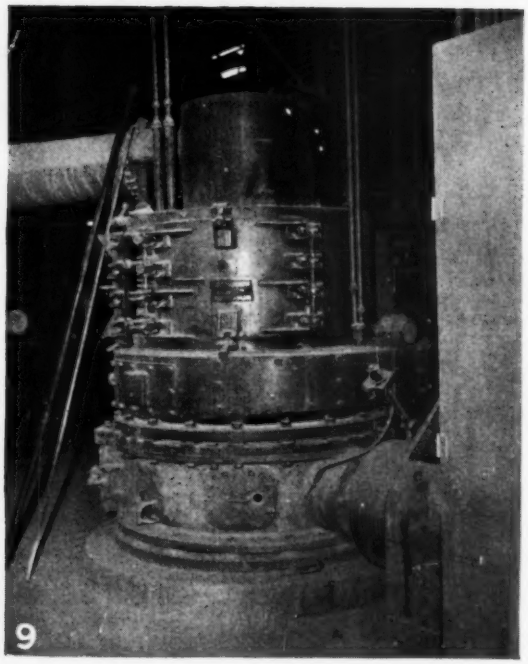


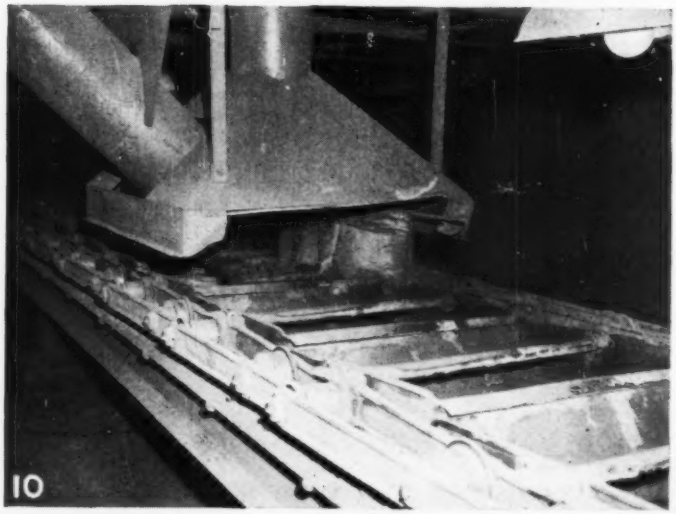


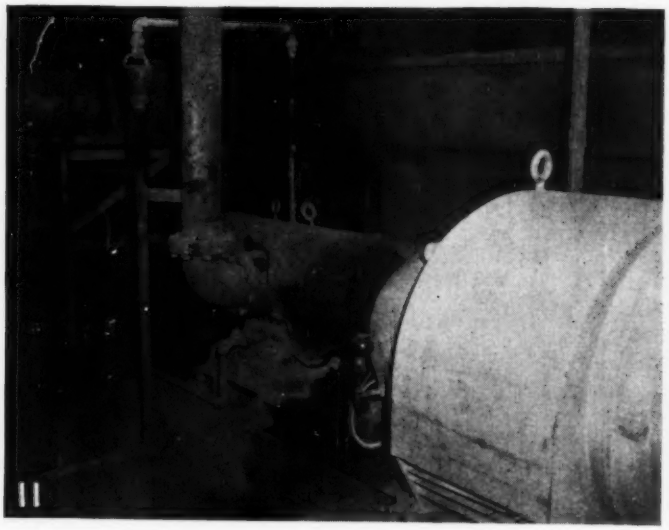


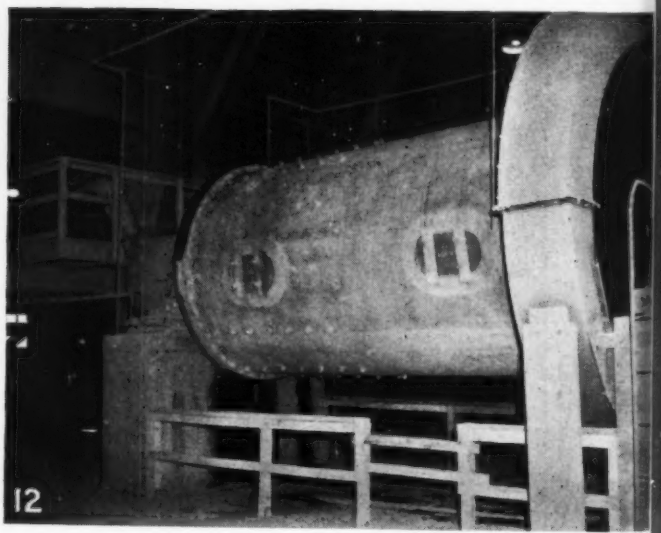










7. The agitator in one of the slurry blending tanks.
8. The dust collector in the cooling building. The masonry saw in the foreground is used to cut lining brick to size.
9. Coal pulverizers are standby equipment.
10. Clinker discharging into one of the carrier systems in the cooler building.
11. One of the cement pumps in the clinker grinding department.
12. One of the ball mills in the clinker grinding department.

veyor to a plant-made bucket elevator and either deposited into two blending tanks above the packing machines, or diverted directly to railroad cars for bulk shipments. Two four tube St. Regis packers are used to bag the cement in Bemis multi-wall sewn paper valve bags. Bags drop from the packer onto a 30-in. rubber belt, and are carried to the loading dock for hand loading into box cars. A Pangborn dust collector gathers dust in this building. Approximately 1,300,000 bbls. of high grade light colored "Ideal" portland cement may be produced yearly.

Electricity is purchased from the Alabama Power Company with a line voltage of 4160 volts. Seven unit substations in the plant step this voltage down to 440 volts for all installations except motors for grinding units, which are on line voltage.

Water is purchased from the City of Mobile, and is used in the plant without further treatment. Approximately 280,000 gallons per day are used. No special provision is necessary for waste water, as a large part of it goes into the atmosphere as steam from the top of the cooling towers.

• Left: A. W. Hooton, superintendent; right, Harley Fleming, assistant superintendent, Mobile plant of the Ideal Cement Company.

Present plans include the use of the two extra kilns for the production of lime from oyster shells. If this is done, a screen will be installed at the waterfront to separate large shells from the dredge run. These "hoe-size" shells would go directly into the lime kilns, while the remainder would go into cement as before. Predicted production is in the amount of 450 tons per day. M. O. Matthews, as vice-president and general manager of the Southern Division Ideal Cement Company, has had most of the responsibility of rehabilitating the Mobile plant.

A. W. Hooton is superintendent of this plant; Harley Fleming, assistant superintendent; Sam Lamb, mill foreman; Carroll Nordean, chief clerk; G. Haskell Rodgers, chief chemist; and Edward Moultrie is plant engineer.

## Western Phosphate Rock Output Sets New Record

New high records both for quantity and value of marketed production highlighted the Western states phosphate rock industry in 1946, as reported by producers to the U. S. Bureau of Mines. Marketed production jumped from 274,198 long tons in 1945 to 492,602 tons in 1946, an increase of 80 percent. The value nearly doubled—rising from $1,489,915 in 1945 to $3,012,157 in 1946. The output in 1946 came from Idaho, Montana and Utah; Wyoming was inactive.

A record marketed production of Idaho phosphate rock in 1946 (312,658 long tons)—more than double that of the previous record made in 1945 (123,340 tons)—made that state the leading producer in the Western region. There were only two companies in Idaho reporting sales of phosphate rock in 1946, the San Francisco Chemical Company, 216 Pine St., San Francisco, and the Anaconda Copper Mining Company of New York City.

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Stamps depicting subjects of mineralogical interest were displayed in the American Museum of Natural History in New York City during the Centenary International Philatelic Exhibition.

• Chevrolet's new line of commercial vehicles was introduced to the trucking industry on June 28. First units were built in the Janesville, Wis., assembly plant. Here Miss Betty Gene Gardner, Ridgeway, Wis., christens the new vehicle, as Governor Oscar Rennebohm, Wisconsin's chief executive, looks on. Also spectators were J. W. Burke, national manager of Chevrolet's truck and commercial department (right), and R. W. Podlesak, Janesville plant manager (left).

## Men of the Industry

(*From page* 83)

squeezing and menacing the well pipes. Protection against these geologic hazards is the service which organizations such as the Halliburton company supplies to the complex petroleum industry. To buy and maintain cementing equipment would entail a prohibitive cost for most producers; so the oil men call on specialists like Halliburton to reinforce their well walls with cement.

To supply more than a million bags of cement which the HOWCO organization uses every year, Halliburton has branched out into cement manufacturing. A new cement plant is being built near Corpus Christi, Tex., which will help supply the quick setting cement needed by the company in their oil field operations.[1]

Erle P. Halliburton, clothed in loose-fitting tweeds, soft spoken, and wearing an unprepossessing manner, contradicts our imaginative "casting" of a lusty, two-fisted empire builder. Underlying the massiveness of the farflung Halliburton interests is a basic concept which has prodded this one-time penniless Tennessee farm boy into creating a multi-million-dollar industrial empire. "Strength is not in being something, but rather in producing something; something that goes in the right direction."

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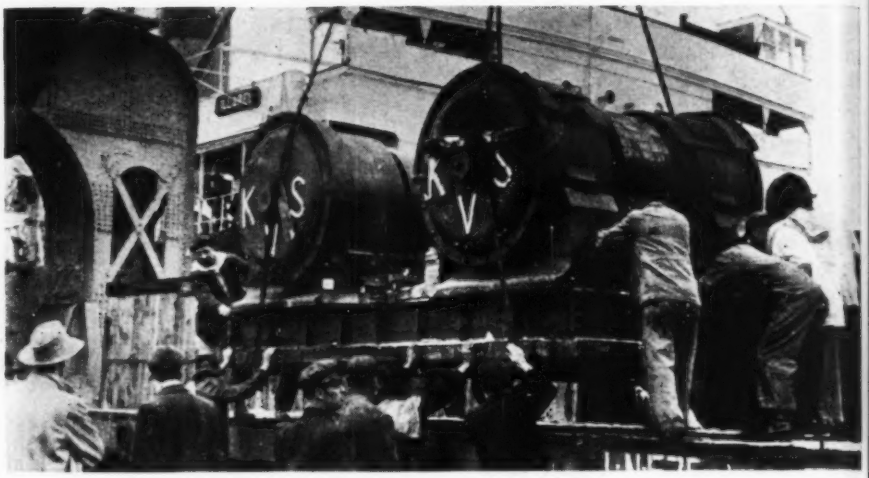
[1] *Pit and Quarry*, January, 1947, p. 102, Tex-Mex Cement Company.

# GILDEMEISTER BUILDS NEW CEMENT PLANT NEAR HUGE CHILEAN LIMESTONE DEPOSITS

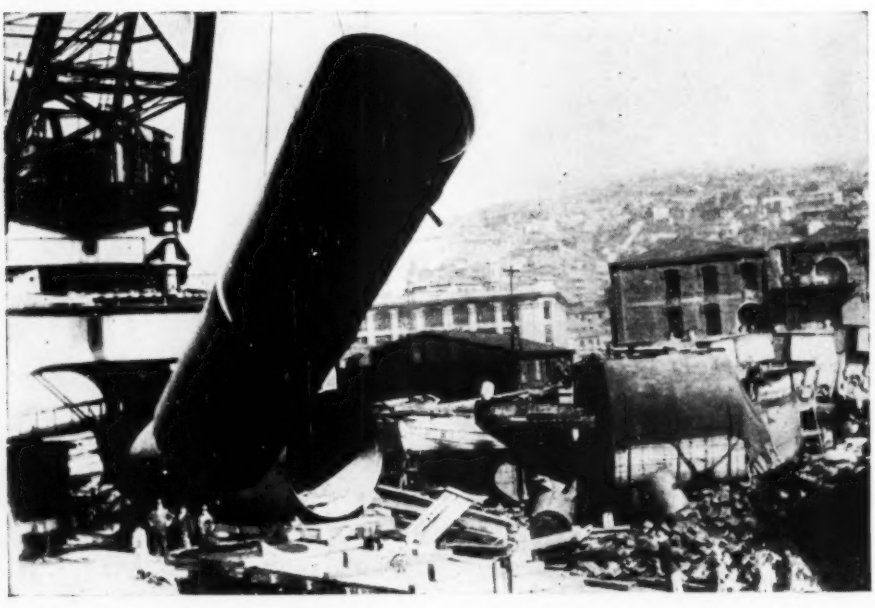
FOR the past ten years, tremendous limestone deposits in the hills surrounding the village of Polpaico in Chile have been under study as the source of raw material for a cement plant. Despite the increased production of the present Cemento el Melon plant, and the recent addition of the newly-started plant at La Serena, there has been a definite shortage of cement in Chile, which has hampered the progress of the city of Santiago and the country at large.

An able Chilean engineer, Don Luis Monge, made preliminary studies of the limestone deposit for the Caja Seguro Obligatorio which indicated that an almost unlimited supply of material was available. This organization decided not to build a cement plant, and further studies were made by the organization of Gildemeister Y Cia, under the aggressive leadership of S. T. Gildemeister. After a careful study Mr. Gildemeister decided to purchase the property and to build a cement plant immediately. It was originally decided to build a plant with a capacity of 100,000 metric tons per year and later double the size of the plant. However, in view of the constant increase in the demand for cement, it was later decided to purchase all of the machinery necessary for a plant of 200,000-metric-ton capacity. It is the purpose of this company to start one unit of the plant at the earliest moment, and follow thereafter with the second unit.



• One of the kiln-carrying roller assemblies being loaded on a flat car at Valparaiso, Chile, for the trip to Polpaico and installation at the cement plant of the Gildemeister Company.

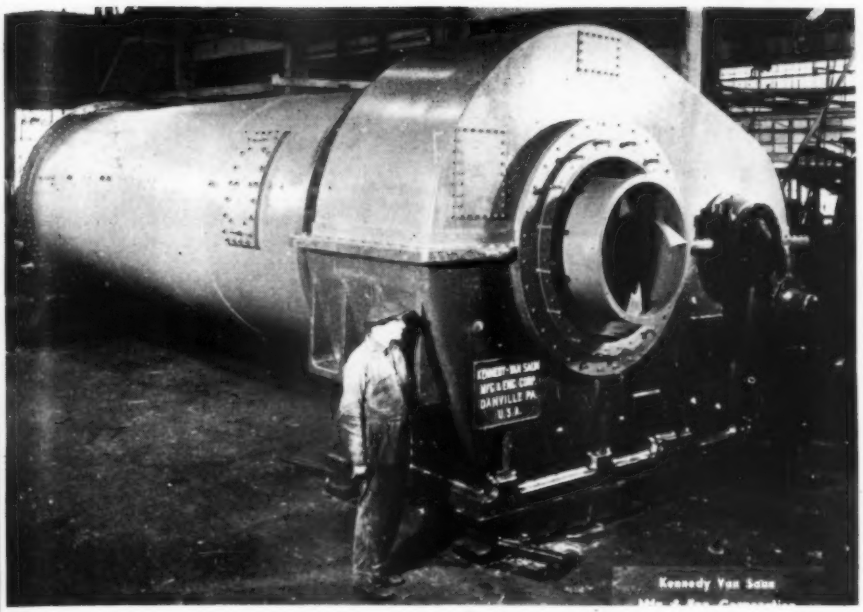
During the preliminary stages of the survey Gildemeister & Co. built a small plant for the manufacture of agricultural limestone and various burned lime products. The first two of three vertical kilns were put in operation in March of 1946. The crushing, conveying and pulverizing equipment for the manufacture of agricultural limestone was purchased from Kennedy Van Saun Mfg. & Eng. Corp. late in 1944, and was put into operation in the latter part of 1945. Both departments are now operating at maximum capacity and further enlargements of this part of the plant must undoubtedly follow.



• Kiln sections shipped from the United States being unloaded at Valparaiso harbor.

The location of the plant is 7 kilometers from the station of Polpaico, which is on the main line of the state railroad running from Santiago to Valparaiso. Polpaico is 55 kilometers from Santiago. The development of the lime and limestone plant made necessary the construction of a highway from Polpaico station to the plant site, as well as a narrow-gauge railroad. The fact that this construction had been completed several years greatly simplified the start of the operation of the new lime plant. However, it was necessary for the company to build a standard-gauge siding from Polpaico station to the plant site. This siding is now completed, and will serve the entire needs both of the lime plant and the new cement plant. Building of this siding in itself was no small engineering feat, because the right-of-way crosses two small rivers. This necessitated the building of two bridges, one approximately 100 feet long, and the other approximately 35 feet long. These bridges had to be built to conform to specifications of the Chilean State Railways, and due to the poor footing conditions, it was necessary to manufacture and drive a great many reinforced concrete piles. Two Davenport diesel locomotives have been purchased for moving the traffic from the cement plant to the main tracks of the railroad.

One of the most important features of an operation of this kind in Chile is the necessity of supplying suitable housing facilities for the employees. Since the construction of the new cement plant requires the services of from 350 to 500 work-




• One of the two large clinker mills being tested before shipment to Chile.

men, one of the first things necessary was to start a housing project for them. A large portion of the new village, including a Post Office and a police station have been completed. The houses for the ordinary workmen are more or less of a "barracks" type, but are of adequate size and supplied with modern facilities. For the various departmental heads and the engineers, a much finer type of individual home is being constructed. The village will ultimately contain stores, a theatre, a small hospital, schools, and of course a church.

A final contract was arranged between Gildemeister & Co. and Kennedy Van Saun, whereby the latter will supply all the necessary machinery for the cement plant. Although this contract was not consummated until February, 1946, more than 90 percent of the entire plant machinery has already been delivered. Progress of the actual installation of the machinery was delayed somewhat because the heavier pieces could not be moved to the plant site until such time as the new standard-gauge siding was completed. In the meantime these larger pieces of machinery were stored in the Gildemeister machinery storage yard at Polpaico station.

Notwithstanding the fact that delivery of new construction machinery was delayed, the company made rapid progress in the excavations for the proposed buildings and machinery, as well as the various railroad sidings which will serve the plant. At present all of the main kiln piers have been completed, and the work of installing and lining up the heavy kiln roller bases is going on.

The plant is the wet-process type, employing the very latest methods of closed-circuit grinding and classification. Excavations for the large thickener tanks are about completed, as well as those for the various slurry tanks. Work is progressing on the overhead craneway which will have a span of 80 feet and a length of 265 feet. A second overhead craneway is being built for the unloading and storage of coal, kaolin and iron ore.

Raw materials coming into the plant will consist of limestone in solid form, mixed with a certain percentage of a decomposed limestone known locally as "poroso." (The operations to date indicate that about 30 percent of the entire deposit is in the form of this so called "poroso.") The limestone will be prepared for mill feed in a closed-circuit crushing and screening system. A large Kennedy primary gearless gyratory crusher will be fed by means of a heavy-duty rock feeder. Stone will pass by belt conveyor to a screen house at which point a vibrating screen will reject all material over ¾ inch. This rejected material will be returned to a Kennedy gearless secondary gyratory crusher for recrushing, and again will pass through the vibrating screen. The "throughs" from the screen house, all of which will be minus-¾-inch in size, will pass by means of a belt conveyor over a Merrick Weight-o-meter, and thence to a large ground storage. An automatic mechanical tripper will distribute the finished mill feed stone over a stockpile approximately 250 feet long containing almost a month's supply of limestone for the plant operation. From this deposit, by means of reclaiming conveyors, the mill feed stone will be fed to the raw-grinding mill hoppers.

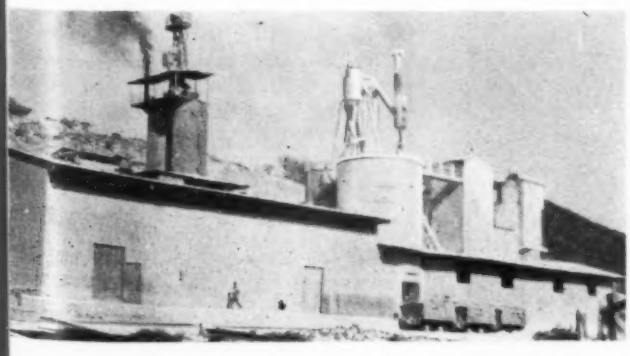
Merrick Feed-o-Weights will feed the limestone to two Kennedy integral-gear-drive mills, 9 ft. in diameter by 12 ft. long. These mills will operate in closed circuit with Dorr classifiers, 14 ft. by 28 ft. 6 in. In order to complete the closed circuit, 9-ft.-diameter sand wheels, operated by separate drives, will be installed at the discharge end of the mills.

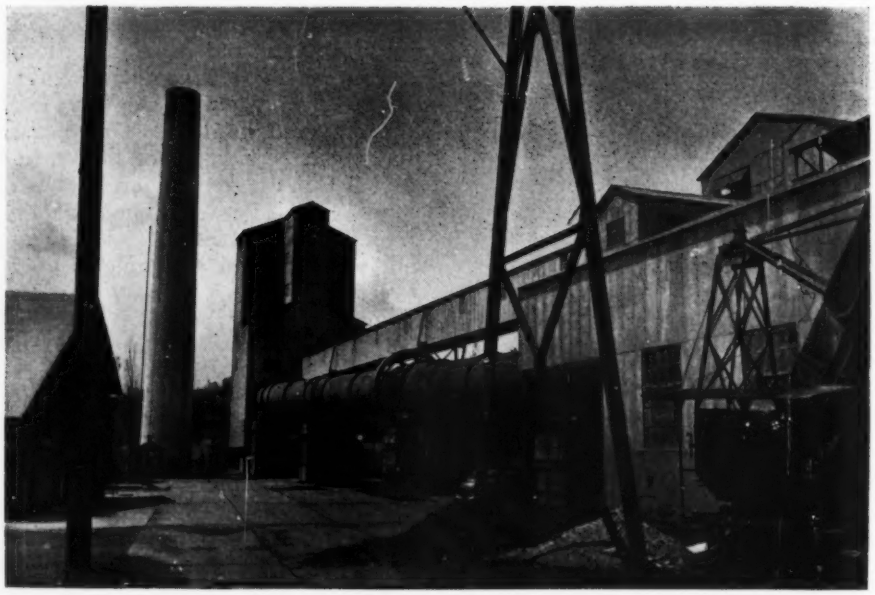
Dorr thickeners have been supplied. For flexibility, two 135-ft. thickener tanks are being constructed. From the thickener tanks, the slurry will pass to conventional slurry storage tanks, each 30 ft. in diameter by 30 ft. high. These tanks will be equipped with Dorr agitating units, using both mechanical and air agitation. Thence the slurry will go

(*Continued on page* 100)

• Left: The existing pilot plant for agricultural limestone and various burned lime products, located between Santiago and Valparaiso.

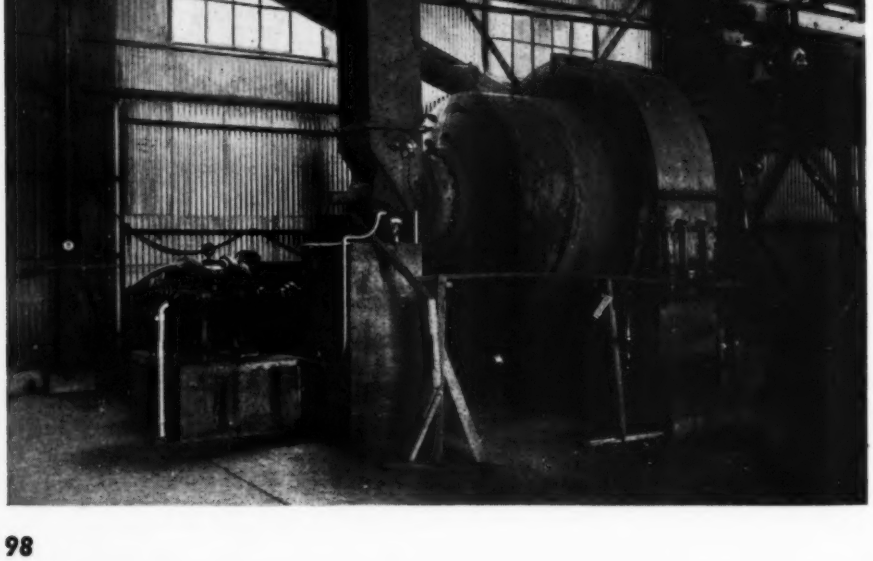
• Right: A scene during the setting of the first kiln-carrying roller assemblies at the new Gildemeister cement plant.





• General view of the new kiln installation at the Northampton, Pa., plant of Lawrence Portland Cement Co. Two induced-draft fans discharge into the stack at the left.

• The coolers consist of 10 tubes on each kiln. The tubes are 15 ft. 8½ in. long and have 4-in. brick linings.



# Lawrence Department

another ON THE SPOT report

FUEL economy, which is always a topic of major interest in the cement industry, has been achieved with a resounding bang in a recently-completed improvement program at the Northampton, Pa., plant of the Lawrence Portland Cement Co. A large investment in new equipment, including new coal mills, two new kilns, and centralized kiln controls, has brought coal consumption down from a former average of about 110 lbs. per bbl. of cement to approximately 70 lbs. This rather startling reduction is attributed in part to the higher efficiency of modern equipment and in part to the obvious economy inherent in changing from four small to two large kiln operations.

Not only does the new equipment fit in perfectly with the balance of the existing plant, but it was made to tie in with existing raw-grinding and storage facilities with the minimum disturbance. Completion of the installation was timed to coincide with a tremendous quarry cleanup job necessitated as a result of a flash flood which occurred last July. More than 1½ billion gallons of silt-laden water filled the 260-ft. deep quarry overnight when heavy rains changed the course of the nearby creek.

The new kilns, furnished by F. L. Smidth & Co., are thought to be the longest dry-process kilns in the world, having shells measuring 314 ft. in overall length by 9 ft. inside diameter. They replace four old type bottle kilns which ranged from 7 to 9 ft. in diameter and from 150 to 180 ft. in length. Productionwise there has been a slight loss, the new kilns producing about 3,200 bbls. per day compared with 3,600 bbls. on the replaced equipment, but labor efficiency has been increased to the extent that only one burner is now required per shift against two under the former setup. For 200 ft. the kilns are lined with 2- by 6- by 30-in. insulating block, which is in turn lined with 4½ in. of refractory kiln brick. The remaining 95 ft. of each kiln is lined with regular 6-in. high alumina brick.

The coolers consist of 10 tubes on each kiln, measuring 2 ft. 8½ in.

• The new air-swept, slide-shoe-type coal mills measure 6 by 8 ft. The entire weight is carried on an oil film when the units are in operation.

# Portland Co.'s New Kiln at Northampton

By W. M. AVERY

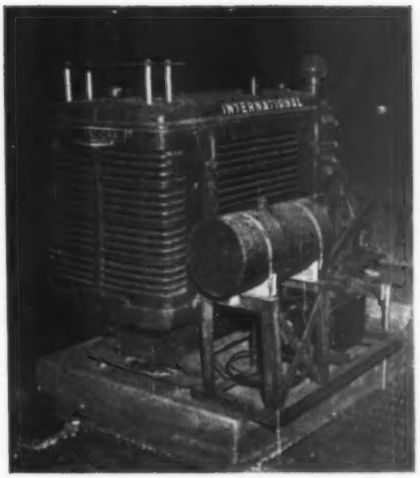
inside diameter by 15 ft. 8½ in. in length, with 4-in. brick linings. They discharge clinker into existing McCaslin conveyors. Beyond this point no important changes have been made in equipment or practice. Each kiln has five supports, with 16-in. face tires at all except the No. 1 support, where the tire face measures 20½ in. The bronze sleeve support bearings are all of the self-aligning type and are water cooled. The 60-hp. Westinghouse drive motors are located near the center supports, and each drive is backed up with an International gasoline engine for use in case of power failure.

Both kilns are controlled from a single F. L. Smidth duplex centralized panel, giving the burner complete direction of such diverse operations as the coal mill feeders, the coal mills, the primary blowers, the kilns and kiln feeders, the induced draft fans, the screw conveyors for composition, and the various elevators and screw conveyors which handle raw materials. The kiln feeders are controlled automatically from the speed of the kilns themselves by means of alternators. Fully interlocked controls give maximum protection against serious damage in the event of failure or breakdown at any point in the flow.

Fuel for the new kilns is pulverized in F. L. Smidth 6- by 8-ft. 2-compartment Tirax mills. These are air-swept mills of the slide-shoe type, the entire weight being supported on an oil film when the units are in operation. Each mill is in circuit with its own kiln, and the coal is dried with hot air drawn from the kiln hoods. They carry a 13,000-lb. ball load, and are driven at 25 r.p.m. by 75 hp. Westinghouse induction motors direct connected to Farrel-Birmingham reducers.

Coal is reduced in a roll crusher as it comes to the plant and elevated to storage bins which were used in connection with the old pulverizing plant. Two new 45-ton steel hoppers, fed from the bins by means of a drag chain conveyor, provide live storage capacity for the new mills, the coal passing from the hoppers into Merrick Feed-o-Weight scales. Drum-type feeders just ahead of the mills function as air locks to prevent drawing in any large amount of cold air. The primary blowers (F. L. Smidth No. 1250 high-pressure fans) draw hot air from the kiln hoods through the mills and deliver pulverized coal to the burner pipes, which are reduced from 12 in. to 7 in. at the nozzle ends.

The Northampton plant is still using 2-stage grinding on raw feed, and the handling and production of composition have not undergone any important changes. All compo-



• Each electric-drive motor is backed up by a gasoline engine for use in the event of power failure.

• The entire operation is controlled from this duplex centralized control panel.

• High-pressure primary blowers draw hot air from the kiln hoods to dry the coal as it is pulverized.

• Support bearings for the kilns are all of the self-aligning type and are water cooled.

• Left: Coal passes from the new 45-ton steel hoppers into scales from which the mills are fed.

sition from the mill passes over a Link-Belt vibrating screen with 8-mesh openings to remove fine foreign particles. Each kiln is equipped with a high-speed induced-draft fan and a Multiclone dust collector to remove dust from the flue gas before it goes to a new 150-ft. rust reinforced-concrete stack. The dust is fed back and blended with the raw feed surplus from an overflow screw conveyor in the composition-handling circuit. The constant-speed overflow screw moves more of the raw material than the kilns require, and the excess drops to a Link-Belt elevator (along with the dust from the Multiclones) to be fed back to the bins. The kiln stock boxes are fed from the overflow conveyor by variable speed screw conveyors.

Although the present Lawrence plant at Northampton was built in 1898 (replacing the original installation made in 1889), constant modernization and replacement have kept the operation in full step with the steady evolution in equipment and processes. In May, 1941, the first direct-firing coal mills were installed on four kilns, which at that time represented about 40 percent of the plant's total burning capacity. An appreciable fuel saving, some increase in capacity, and improved quality and uniformity were achieved by this installation.

In 1940 the clinker-grinding department was improved by the installation of three 16-ft. diameter Sturtevant separators, operating in closed circuit with nine No. 16 Smidth 5½- by 22-ft. tube mills. Finished cement from the three separators is fed by screw conveyor to an 8-in. Fuller-Kinyon pumping system which discharges into storage silos. The conveying systems and the tube mills are connected to a Norblo dust collector.

In addition to the dry-process plant at Northampton, the company operates a wet-process plant at Thomaston, Maine.

## Gildemeister's New Plant

(*From page* 97)

through blending tanks of the same size, and eventually through the final storage tank, located at the end of the kiln, which is 60 ft. in diameter and 20 ft. deep. Two Kennedy 11 ft. by 10 ft. by 30 ft., 5-tire kilns will be used. These are in process of being erected at this time. The burned clinker will be cooled in two Kennedy rotary coolers, each 8 ft. in diameter by 80 ft. long. These coolers will discharge directly into a slinker pit, from which the overhead crane will take the clinker either to the bins ahead of the clinker-grinding mills, or to storage under the crane. Provision has been made to screen the discharged clinker, so that any oversize material can be run through a crusher and thence returned to the craneway.

The clinker-grinding department is comprised of two Kennedy integral-gear-driven tube mills, each 8 ft. in diameter by 22 ft. long, with two compartments. The mills are designed to work in closed circuit, each with a 16 ft.-diameter Sturtevant separator. The finished material will be transported from the separator to the final storage silos by means of two Kennedy automatic pneumatic transport pumps.

The storage and bagging department will at first consist of four silos, each 30 ft. in diameter by approximately 70 ft. high; the rectangular space between the four silos will be used as an additional storage space.

The entire bagging department is being designed so that it can first be doubled, then tripled, in capacity. The first unit will consist of two 4-tube St. Regis bagging machines, complete with all of the necessary machinery for feeding them, and with bag conveyors for taking the filled bags either to cars or to storage.

The company proposes to use coal for firing the kilns, at least during the early days of the operation. The Kennedy direct-fired, pulverized coal system will be used, comprising two 7 ft. by 12 ft. integral-gear-driven mills, with No. 60 Kennedy fans. However, in view of the possibility of future coal shortages, both kilns are also equipped for burning fuel oil, so that the transition from coal to fuel oil can be made in a few minutes' time.

Power will be provided by a hydro-electric station some 40 kilometers away, and the company is building transmission lines and transformer and sub-stations. It is this phase of the operation which may delay the starting of the plant, due to very poor deliveries of transformers and sub-station equipment.

## Modern Limestone Plant in Production at Lebanon, Tenn.

A limestone plant equipped with the latest models of machinery began operation near Lebanon, Tenn., on May 1. The owners, Dick Lowlor and Albert Stone, stated that the Lebanon Limestone Company will make all sizes of crushed rock, with special attention devoted to agricultural limestone and aggregates suitable for concrete block units.

The limestone has been approved for agricultural purposes by the Tennessee State Production and Marketing association, and on the test, the rock was found to contain 99.37 percent pure calcium carbonate.

# Universal Atlas Installs Dust Collector In Leeds Modernization

By ROBERT W. SPAKE

another ON THE SPOT report

THE Leeds, Ala., plant of the Universal Atlas Cement Co. was redesigned and modernized in 1937-38, and became the first wet process plant of the company.[1] (Three wet process plants are now operated by the company.) Two 10-ft. by 300-ft. kilns were installed during the modernization program. Through the efficient use of induced draft, the kilns are now producing about 30 percent above their signed capacity.

Part of the modernization program was to have been the installation of a dust collector system which would remove the free particles from the kiln flue gases. This plan, however, was delayed due to the war, and installation has only just been completed.

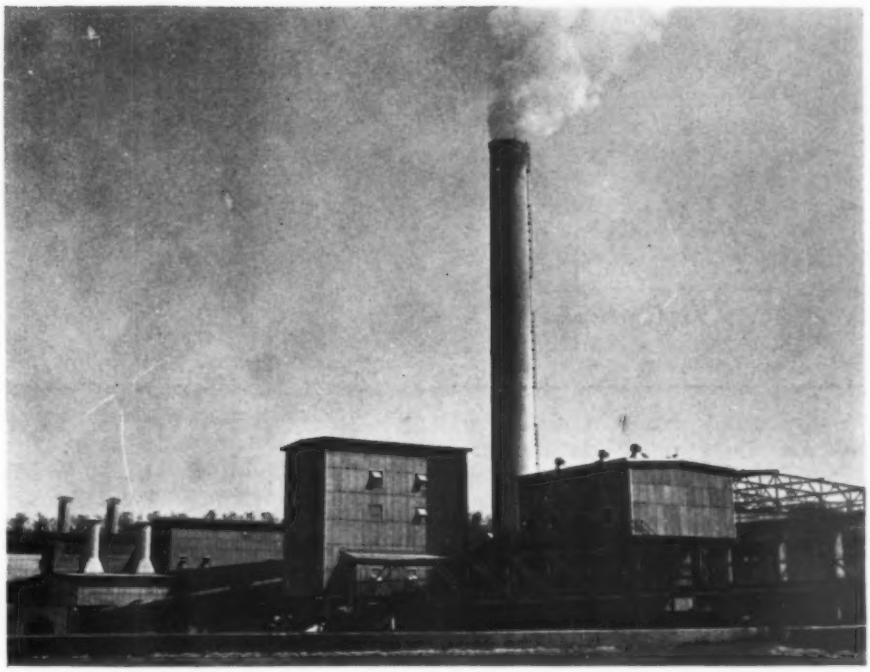
The type of collector chosen was a Western Precipitation Corp. Cottrell type electrical precipitator. This installation is a 3-unit, 3-section type, and is of the newest design, in that small pipes are used as collecting electrodes instead of corrugated plates or steel strips. The precipitator is furnished with a guarantee that it will remove 90 percent of the solids from the kiln gas.

Modern Cottrell units such as this one consist of four functional parts:

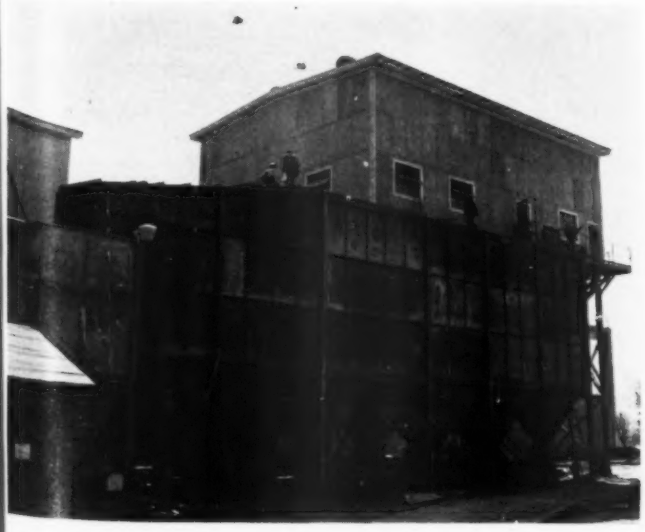
1. A source of high voltage.
2. High voltage ionizing electrodes and associated collecting electrodes.
3. A medium or means of disposing of the collected material. In a dry collection machine, such as the one in question, the material is dislodged from the collecting electrodes by rapping, and is collected in hoppers.
4. A shell to house the precipitator.

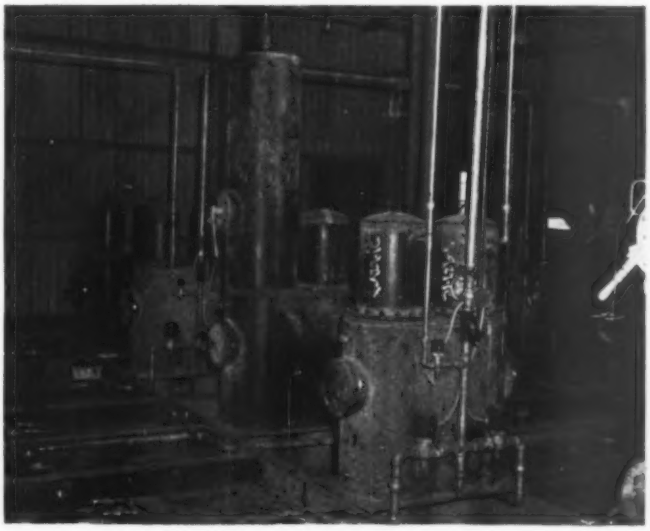
As a source of high voltage, 440-volt line current is fed into six General Electric 25-kva. transformers which step the current up to the 40,000-70,000 volt range. This high voltage a.c. is fed to six General Electric mechanical rectifiers, which produce the unidirectional current necessary for the precipitator. The merchanical rectifier is fundamentally a synchronously driven make-and-break switch. The drive is a special electric motor, and the rectifier is a rotating disc of insulating material, with arcing tips and four stationary shoes suitably connected to the high voltage transformer terminals, the precipitator, and ground.

(*Continued on page* 113)



• A general view of the Universal Atlas Cement Company's plant at Leeds, Ala., showing the thickener (foreground), the kiln (left rear), the new dust collector (center right) and the stack emitting dust before the installation of the precipitator.





• Left: An exterior view of the precipitator, showing screw conveyors under the bin.
• Right: The operating floor of the precipitator, showing insulator boxes. The piping is part of the automatic rapping system.

[1]Pit and Quarry, Sept., 1939, p. 32, Trauffer, W. E., *Universal Atlas Plant at Leeds, Ala., Firm's Only Wet Process Operation.*

# Rock Weathering as a Possible Factor In Alkali Aggregate Reaction

By D. G. RUNNER
Geological Engineer
Washington, D. C.

THE literature during the past few years has contained numerous articles[1] dealing with the disintegration of portland cement concrete. One possibility bordering on this subject is that, during the weathering of rock, certain secondary minerals are formed which may contribute indirectly to the destruction of the concrete. In many instances the failure of the concrete has been attributed to the chemical activity of the alkalies ($Na_20$ and $K_20$) in the cement when used in conjunction with certain silica-bearing rocks. As a result of this activity a substance, having the appearance and form of a gel, is developed which appears to cause undue distress in the concrete. Figure 1 is a view of desiccated gel that has resulted from such chemical reactivity in concrete.

In numerous laboratory studies of certain silica-bearing rocks, it has been observed that some of these rocks and minerals, such as opal, andesite, volcanics with glass bases, chalcedony and others, are capable of producing an alkali reaction when found in concrete fabricated with high-alkali cements.[2]

In connection with the above phenomenon it was thought that perhaps the weathering, or change by chemical attack, of rocks might be considered a contributing factor insofar as the alteration of original minerals were concerned. As is well known, rocks on or near the earth's surface are constantly under attack by such destructive agents as the atmospheric air, temperature variations and ground waters carrying dissolving ingredients in solution. The atmospheric air is practically constant in composition, except for possible variations in the amount of water vapor. The following table gives the volumetric composition of the atmospheric (chief constituents only).[3]

TABLE 1.

| Item | Percent |
|---|---|
| Nitrogen | 78.03 |
| Oxygen | 20.99 |
| Argon | .94 |
| Carbon dioxide | .03 |

From all indications, the principal constituents which produce the greatest destructive effect upon rocks are oxygen and carbon dioxide. Oxygen, in the presence of moisture, acts on the various minerals within the rock, chief among which are the iron-bearing minerals. These oxidize rapidly and produce the brown or yellowish-brown stain usually noticed in rocks containing an appreciable amount of iron-bearing minerals. Continued oxidation may cause the rock eventually to disintegrate. The iron sulphides produce sulphates; and these, being soluble, are removed in solution. On the other hand, if the sulphates are not removed, the oxidation will result in a bulk increase which causes the rock to break down. The mechanical weathering of rocks forms finer particles and exposes greater surface areas to the attacking agents. Naturally, near the surface where the particles produced by mechanical weathering are smaller, the chemical alteration of the minerals is greatest. Figure 2 illustrates the progressive weathering of a granite outcrop into the soil above.

Rain falling through the atmosphere combines with the carbon dioxide ($CO_2$) to form carbonic acid ($H_2CO_3$) which attacks carbonate rocks. Figure 3 is a view of a limestone rock, showing the effect of solution. Ground water is also very likely to acquire sulphuric acid from the breakdown of such minerals as pyrite, and as a result contribute to the destruction of rock. Silicates of potassium, sodium and iron in the rock are also attacked by acids, with the subsequent formation of carbonates of these bases and the liberation of silica. The following equations illustrate the possible reaction which may take place.

$$Na_2SiO_3 + CO_2 + H_2O = H_2SiO_3 + Na_2CO_3$$
$$H_2SiO_3 = H_2O + SiO_2$$

It should be borne in mind, however, that this process does not occur in a short interval of time, but may take years to reach an end point.

In connection with the changes produced in minerals by weathering agents, reference is made to table 2. Here are shown some original rock-forming minerals together with their weathering products and the minerals deposited from solution. Note that in almost every instance listed, colloidal silica is shown as one of the materials removed in solution. The silica, upon being redeposited or left behind in the soil, may possibly form opal, chalcedony, and quartz. Although quartz thus far appears to be free from any suspicion of chemical reactivity, opal and some forms of chalcedony are not so fortunate.

It is reported[4] that in the decomposition of a rhyolite, sanidine (potash feldspar) passes into kaolin and opal, with the latter separating out as hyalite in veins or impure concretionary forms. Thus it may be noted that weathered rocks contain new minerals which may possess the capacity of reacting chemically

Table 2
Alteration of Some Rock-forming Minerals. (Modified after Holmes, Branson & Tarr)

| Original Minerals | Composition | Products Removed in Solution | Minerals Deposited from Solution or Left Behind in the Soil |
|---|---|---|---|
| Quartz | Silica | $SiO_2$ | Opal, Quartz, chalcedony |
| Orthoclase and Plagioclase | Potassium, Sodium, Calcium, Aluminum, Silica | $Na_2CO_3$, $Na_2SO_4$, NaCl, $CaCO_3$, KOH, Colloidial-silica | Clay Minerals, Potash, Gypsum, Saline Deposits, Colloidial-silica. |
| Hornblende and Pyroxene | Calcium, Magnesium, Iron, Aluminum, Silica | $CaCO_3$, $CaSO_4$, $MgCO_3$, $MgSO_4$, Colloidial-silica | Clay minerals, Hematite, Limonite, Colloidial-silica. |
| Pyrite | Iron | $FeSO_4$ | Marcasite, Gypsum. |

[1]Stanton, T. E., *Expansion of concrete through reaction between cement and aggregate*, Proc., A.S.C.E., vol. 66, Dec., 1940.
Tremper, Bailey, *Evidence in Washington of deterioration of concrete through reactions between aggregates and high-alkali cements*, Journal, A.C.I., vol. 12, June, 1941.
Coombs, H. A., *Expansion of concrete due to reaction between andesitic aggregate and cement*, American Journal of Science, vol. 240, April, 1942.

[2]Portland cements containing more than 0.6 percent of alkalies (soda plus sodic equivalent of potassa) may be considered high-alkali cements.

[3]Clarke and Washington, *The composition of the earth's crust*, Prof. Paper 127, U. S. Geol. Survey, p. 33, 1924.

[4]Merrill, G. P., *Rocks, Rock-Weathering and Soils*, The Macmillan Co., New York, p. 238.

Fig. 1. Desiccated gel resulting from chemical activity in concrete.

Fig. 2. Progressive weathering of a granite outcrop into the soil.

with the alkalies in portland cement, to produce distress in concrete.

It has been shown[5] that micas, when exposed to the action of carbonated waters, became hydrated with subsequent increase in volume. Other minerals attacked by carbonated water include olivine, oligoclase, augite, and hornblende. The labradorite, hornblende, and augite were acted upon rapidly but orthoclase was the least soluble.

Acid waters derived from the oxidation of pyrite by their action on limestone produces gypsum. Gypsum may also be produced by the weathering of certain minerals containing calcium and the alkalies. The mineral gypsum is unquestioned as a possible agent in alkali-aggregate reaction. However, it may be considered dangerous from the standpoint of durability of concrete, due to the formation of calcium sulpho-aluminate needles. The formation of these needles under certain conditions may have a very destructive effect upon concrete.

The analyses in table 3 are presented in order to show actual data regarding the effect produced by weathering upon rocks. The gneiss is an acid, or high silica rock, while the diabase is basic or low in silica content.[6]

Table 3

| Constituents | Gneiss (a) | | Diabase (b) | |
|---|---|---|---|---|
| | Fresh | Decomposed | Fresh | Disintegrated |
| $SiO_2$ | 60.7 | 45.3 | 49.4 | 43.4 |
| $Al_2O_3$ | 16.9 | 26.6 | 15.3 | 18.4 |
| $Fe_2O_3$ | 9.1 | 12.2 | ..... | 20.4 |
| CaO | 4.4 | Tr. | 9.6 | 2.4 |
| MgO | 1.1 | 0.4 | 7.4 | 3.5 |
| $K_2O$ | 4.3 | 1.1 | 0.9 | 0.6 |
| $Na_2O$ | 2.8 | 0.2 | 2.0 | 0.1 |
| Ignition | 0.6 | 3.8 | 3.3 | 11.3 |

(a) Albemarle County, Virginia.
(b) Spanish Guiana, Venezuela.

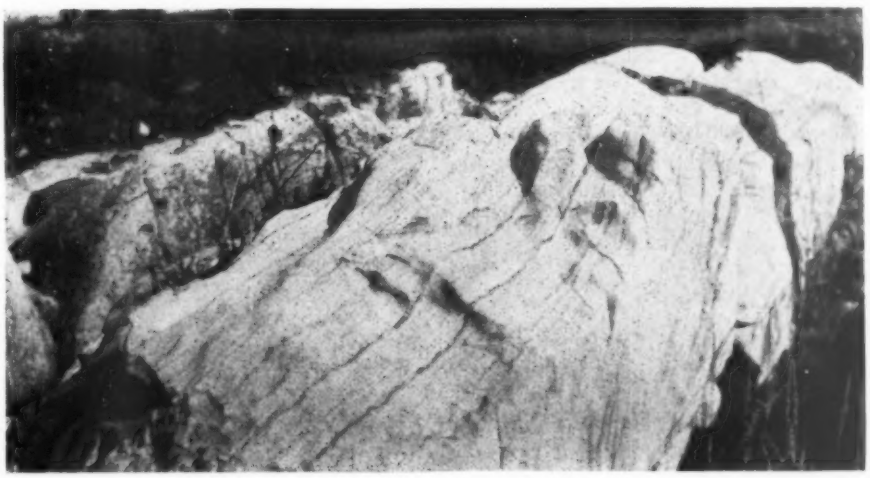
From the data indicated in the table it may be readily seen that there is a distinct difference in the amount of oxides after attack by weathering agents.

The ignition values are much higher for the decomposed rock. It would seem that alumina compounds are not attacked by weathering agents and since there is a definite loss of silica, the $Al_2O_3$ and $Fe_2O_3$ would definitely increase. The decrease in percentage of lime, magnesia, and the alkalies in the weathered material is probably due to the greater solubility of minerals containing these chemicals under atmospheric condition.

The resulting chemical products of rock weathering are extremely variable, due to the complexity of the minerals in the original rock substances. According to Clarke[7] in the residues remaining after the leaching of rocks, there may be free silica either as quartz or opal, fragments of undecomposed minerals, hydroxides and a number of indefinite claylike substances. Hydrous silica and alkalies weathered from certain rocks might be accumulated elsewhere and become dangerous in potential aggregate deposits, or there is the possibility that they may be deposited in the same aggregate formation.

It should not be construed from the preceding discussion that all weathered rocks provide questionable aggregate, nor that they are potentially reactive when used with high-alkali cements in concrete. The fact remains, however, that there is a strong possibility of the formation of secondary minerals resulting from weathering action on rocks. Such minerals should not be overlooked, for the reason that their use in concrete might lead to troublesome situations.

Fig. 3. Limestone rock showing the effect of solution.



[5]Clarke, F. W., *The Data of Geochemistry*, Bulletin 770, U. S. Geol. Survey, p. 482.
[6]Merrill, G. P., *Data from Rocks, Rock-Weathering and Soils*, The Macmillan Co.
[7]Clarke, F. W., *The Data of Geochemistry*, Bulletin 770, U. S. Geol. Survey, p. 494.

# World Picture of Cement Industry Shows Current Large-Scale Expansion

## LATIN AMERICA—MEXICO, SOUTH AMERICA AND THE CARIBBEAN

SINCE the review article in the January, 1947, issue of PIT AND QUARRY was published there has been comparatively little change in the conditions affecting the cement industry in Latin America—Mexico, Central America, South America and the Caribbean. The demand for cement in general still far exceeds the supply and the construction of a number of new plants is still rumored. Several new plants have been completed during the year and in a few countries it appears that the local supply now approximates the demand. In a few countries the peak of the post-war construction boom seems to have passed but in most of them there seems to be no slowing down. Much of this demand is due to the industrialization of countries which formerly had to import most of their manufactured needs.

Most of the information contained in this review was obtained direct from the producers themselves, from manufacturers of equipment in the United States and other sources. As any such review is bound to be it is only partially complete but at least gives the reader some idea of the tremendous amount of expansion and improvement going on in the cement industry throughout the world. As U. S. equipment manufacturers have in the past sold largely in the Western Hemisphere and this condition still exists to some extent our information is naturally more complete in that area. We do know, however, that cement machinery manufacturers in England, Denmark and South Africa, particularly, are supplying large quantities of equipment to the cement industry in other parts of the world but we have as yet been able to get very little direct information on their activity.

### MEXICO

Since 1936 there has been a slow but steady increase in the production of cement in Mexico. This has been made possible by the enlarging of old plants and the building of new ones. Until 1942, when the industry was unable to supply the demand, cement was imported in limited quantities to border points and the yearly importation varied between 4,000 and 15,000 metric tons. However, in 1943 43,000 metric tons of cement was imported from the United States for use not only at border points but for interior consumption as well, and these importations continued to increase so that during 1944 more than 60,000 tons were brought in from the United States. During 1945 about 109,000 tons was imported and about 175,000 tons during 1946. It was not until 1946, when steamship companies renewed service between Europe and Latin America, that a considerable tonnage of cement was imported from England, with minor imports of artificial and blast furnace portland cements from Belgium, France, and on occasion from Greece and Poland. These latter cements are reported to be of somewhat inferior quality to the cements produced in Mexico.

A resume of production and imports since 1936 is given below:

| Year | Mexican Production (Metric Tons) | Importation (Metric Tons) |
|---|---|---|
| 1936 ..... | 285,978 | 6,897 |
| 1937 ..... | 344,693 | 11,757 |
| 1938 ..... | 373,712 | 15,882 |
| 1939 ..... | 409,784 | 5,083 |
| 1940 ..... | 484,992 | 4,475 |
| 1941 ..... | 537,464 | 4,055 |
| 1942 ..... | 560,403 | 6,380 |
| 1943 ..... | 596,690 | 42,962 |
| 1944 ..... | 619,096 | 69,556 |
| 1945 ..... | 808,318 | 108,958 |
| 1946* ..... | 950,000 | 175,000 |
| 1947* .....1,150,000 | | 65,000 |

*Estimated.

Of the total estimated production of 1,150,000 tons for the year 1947 it appears that the older plants that have been in operation five years or longer, will produce about 900,000 tons in the eight corresponding factories, whereas only about 250,000 tons will be produced in five of the new plants that have been in operation a year or more, and in the four new plants under construction that expect to begin operations sometime during the year.

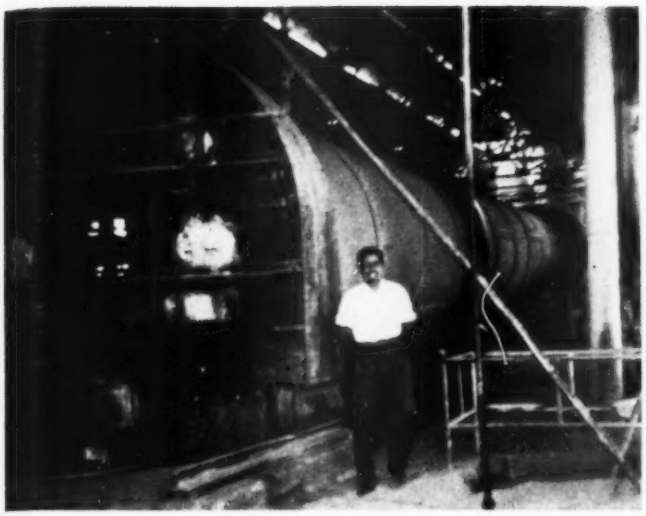
The older plants continue to sell cement at $105.00 per ton f.o.b. factory, while the newer plants that have had difficulty in getting into operation will sell their products at higher prices ranging up to $120.00 per ton f.o.b. factory. The imported cements have an average laid down cost in Mexico of about $140.00 per ton and are not required to pay the $20.00 per ton import duty until such a time as the Mexican industry is in a position to supply the demand. While there was a slump in government and private construction which began in December 1946 and continued through February 1947, the present planned government and private construction will absorb all of the possible production of the Mexican industry during 1947 and very likely require the importation of about 65,000 metric tons.

**Nacional** The plant of Cementos Portland Nacional at Hermosillo, Sonora, has been re-erected at its new location with an increase in capacity to 250 tons daily. The necessary foundations and concrete work were prepared by the Macdonald Engineering Co., builders of the original 120-ton wet-process plant. The Traylor Engineering & Mfg. Co. supplied most of the new equipment including two crushers, a grizzley, two table feeders, a 7- by 30-ft. 3-compartment mill, and the 180-ft. extension to the original Traylor 9-ft. 8-in. by 150-ft. rotary kiln. The actual operation of this rebuilt plant was slated for June 15 pending the arrival of necessary electrical switch-gear.

**La Tolteca** Construction is reported to have started on the new 750-metric ton plant of La Tolteca Compania de Cemento Portland, S.A. at Tolteca, Hidalgo, the detailed plans for which were reported in the January article.

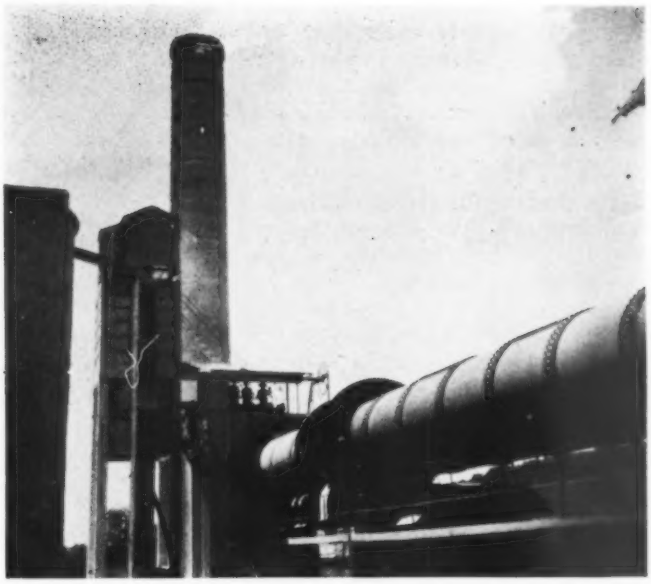
**Del Bajio** The plant of Cementos Portland del Bajio, S.A., at Leon, Guanajuato, is said to be ready to operate but no official word has been received that it has actually produced cement. This is a 450-metric ton dry-process operation.

**Chihuahua** The new 800-bbl. plant of Cementos de Chihuahua, S.A., at Chihuahua, Chihuahua, went into operation early in 1947. A complete description of this plant is presented elsewhere in this issue. This is said to be the first new plant equipped with Nordberg Process Machinery Division cement mill equipment.



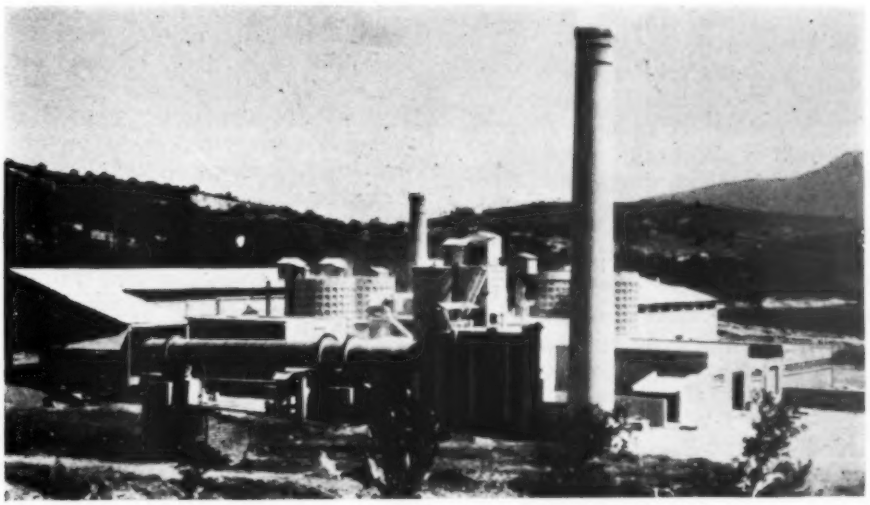
• The No. 1 kiln in the plant of "La Cruz Azul" at Jasso, Hidalgo, Mexico.

• Below: The operator at the Jasso plant in radio communication with "La Cruz Azul" main office in Mexico City.



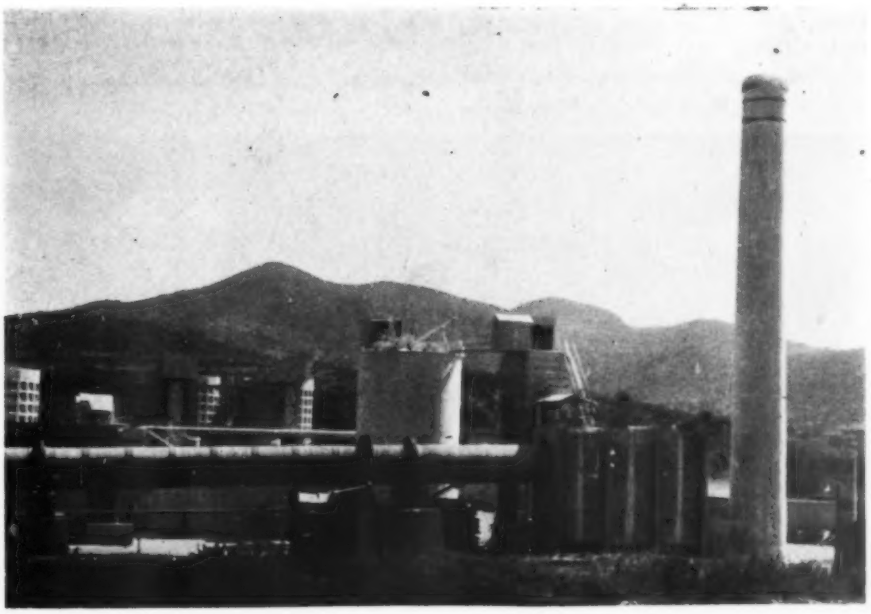
• The rotary kiln and stack at "Cementos Anahuac."

• Below: The vertical kiln and stack at the Anahuac plant.



• A general view of the plant of "Cementos Anahuac," for which expansion and improvement plans are being considered.

• Below: Another view of "Cementos Anahuac." Note the unusual construction of the concrete silos.



**Veracruz** According to the latest reports plans are progressing on a 50-percent capacity increase for the plant of Cementos Veracruz at Orizaba, Veracruz. This 200-ton plant went into operation early in 1945.

**Cementos Guadalajara** Cementos Guadalajara, S.A., at Jalisco, Guadalajara, is making a 240-ton addition to its existing plant. A 9- by 10½- by 9- by 270-ft. Allis Chalmers kiln with a grate-type cooler is being installed and the capacity of the clinker-grinding department is being increased by the installation of two new No. 830 Compeb mills.

**La Cruz Azul** Cooperativa Manufacturera de Cemento Portland "La Cruz Azul," S.C.L., is reported to be doubling the capacity of its new plant at Lagunas, Oaxaca. The existing 10- by 11¼- by 175-ft. kiln will be lengthened to 350 ft. and operated as a dry-process kiln in conjunction with a 4½- by 70-ft. air-quenching clinker cooler. A Bradley Hercules ram mill is also being installed.

No major improvements have been made to the Cruz Azul plant at Jasso, Hidalgo, but it has been kept in good operating condition. This plant is a cooperative and excellent facilities have been developed for housing the employees. Excellent medical service, with a corps of specialists, is also provided. New recreational facilities have also been added and there are now provisions for baseball, soccer, basketball, frontennis, tennis, and swimming. There is also a modern theater with a capacity of 700 persons.

J. Meyer of Cia. Occidental de Maquinaria, Guadalajara, Jalisco, announces that two new cement plants are to be built at Torreon. One of these is to produce 200 tons of gray cement and the other 100 to 150 tons of white cement daily. The deposit is said to be of suitable chemical analysis and to be located on a river and two railroads. According to Mr. Meyer there are already 36 carloads of machinery on the premises, and two kilns and coolers for the smaller plant have already been purchased in the United States and will be shipped in soon from their present location. The new company will be known as "Cementos Ancla de Torreon, S.A."

## CARIBBEAN COUNTRIES

**Cuba** The demand for cement in Cuba continues to exceed the capacity of the plant of the Lone Star Cement Corp. there in spite of the recent addition of a fourth kiln. A fifth kiln will be installed this year if the necessary equipment can be obtained. A new storeroom and machine shop were also built at the Mariel plant to replace those destroyed by fire in 1944.

**Dominican Republic** The buildings for the new cement plant under construction in the Dominican Republic were completed late in 1946 and the production of cement awaits only the installation of a few units of equipment. It is expected that when this source of supply is available the construction volume in that country will again reach the record levels of 1944 and 1945.

## SOUTH AMERICA

**Colombia** Construction is said to be progressing rapidly on the new plants of Cementos del Caribe, S.A., at Barranquilla, and Cementos del Valle, S.A., at Cali, Colombia. The Caribe plant has two 10- by 240-ft. Allis-Chalmers kilns equipped with 4½- by 70-ft. air-quenching clinker coolers. Both plants have Dorr closed-circuit grinding systems with slurry mixers and thickeners.

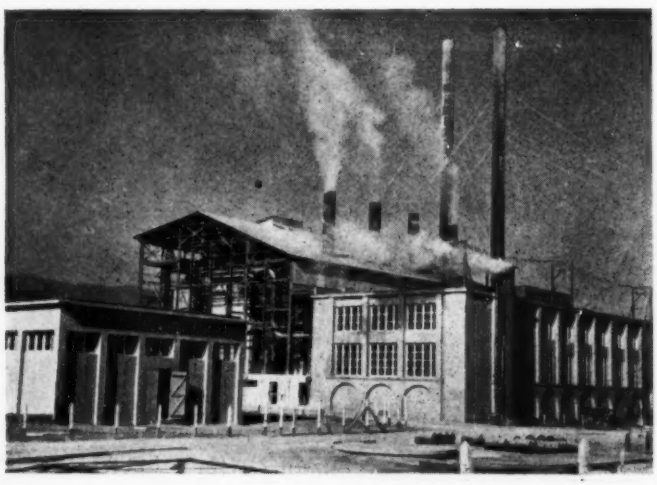
The new plant of Cementos el Cairo at Medellin, Colombia, is being equipped with two 10- by 240-ft. chain-equipped Allis-Chalmers rotary kilns with 4½- by 70-ft. air-quenching clinker coolers.

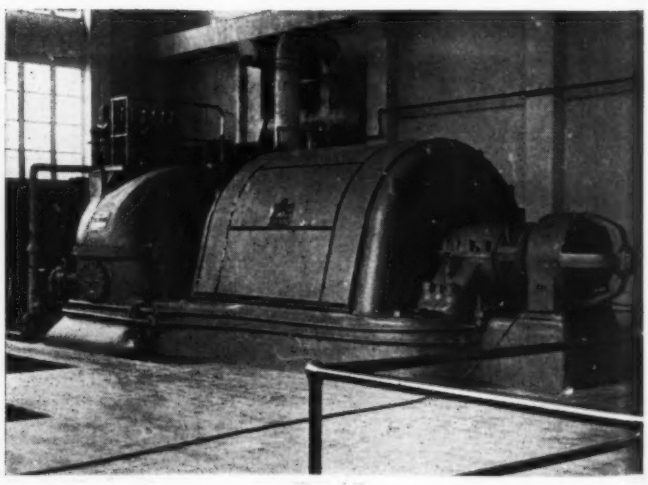
**Chile** Considerable expansion of the cement industry in Chile is expected because of the fact that, late in 1946, the directors of the Fomento Corporation increased the capital of the Juan Soldado cement plant at La Serena from 40,000,000 to 210,000,000 pesos. A few additional photographs of this new plant have been received since January and these appear in this article.

In spite of delays in the receipt of equipment construction is said to be progressing rapidly on the new plant of Sociedad Minera E Industrial "Polpaico" Ltda., near Polpaico which is 55 km. from Santiago. This plant will have an ultimate capacity of 200,000 metric tons per year. More complete details on this plant are given elsewhere in this issue.

**Venezuela** Late in 1946 La Financeria Venezolana, S.A., Calencia, Venezuela, bought the entire stock of Compania Anonima "Cemento Carabobo." The new owners intend to increase the capacity of the plant 100 percent and are preparing orders for equipment to duplicate the present plant.

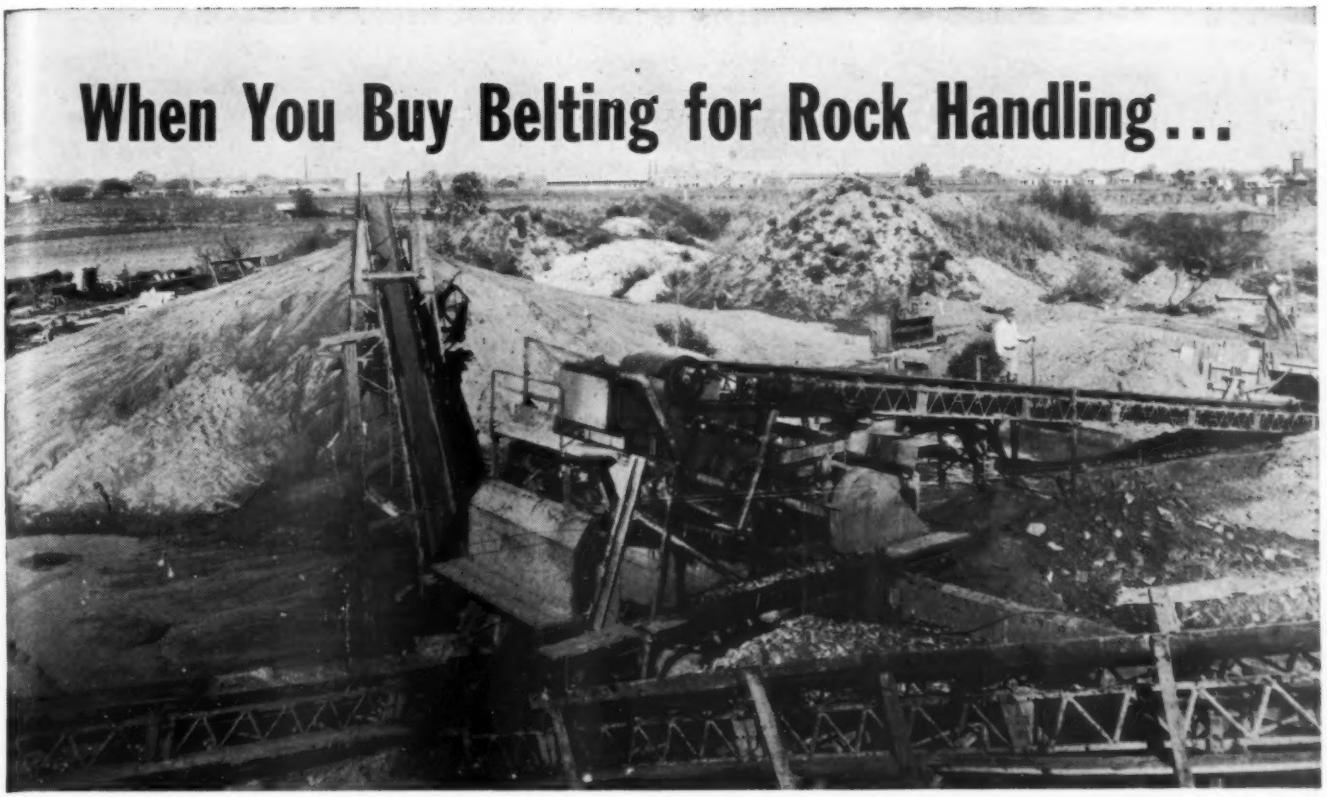
**Brazil** The cement shortage still exists in Brazil in spite of the fact that some recent increase in capacity has been reported. The demand apparently increases faster than the supply but it is stated that the productive capacity will be further increased. Production has been handicapped somewhat by a shortage of fuel and bags but ample supplies of raw material are available. The government has temporarily





- Left: The power plant and waste-heat-boiler building of the Juan Soldado cement plant at La Serena, Chile.
- Right: The 10,500-kw. turbo-generator in the Juan Soldado plant.

# When You Buy Belting for Rock Handling...



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suspended the duty on imported cement to alleviate the shortage.

It is reported that there are now 7 cement plants in operation in Brazil with a total capacity of 810,000 metric tons per year. At least one new plant, that of Belo Horizonte, is expected to go into operation soon and this will add another 50,000 tons. An additional kiln being installed at a plant in Sao Paulo will increase its capacity 50,000 tons annually. The new plant of Compania Paraiso de Cimento Portland is also reported to be under construction and may be in operation by 1948.

The Lone Star Cement Corp. is planning to add a third kiln to its plant at Guaxandiba in order to help relieve the shorage of cement. Because of slow deliveries of equipment and parts this installation is not expected to be completed until 1948. The equipment ordered includes two 9½- by 17-ft. wet raw-grinding mills.

Cia Brasileira de Ciment Portland early in the year put in operation a small dry-process plant at Esteio, in the state of Rio Grande do Sul, about 20 km. from Porto Alegre. The capacity is about 30,000 bbl. per month.

**Argentina** Some additional interesting sidelights have been received on the condition of the cement industry in Argentina. In 1939, at the beginning of the war, there were 11 plants in Argentina with a total capacity of 2,100,000 tons annually. As the maximum consumption of the country was 1,254,325 tons in 1938, and has not since been surpassed, it seems that the program of the industry calls more for readjustment than for expansion.

During the war there was a severe shortage of fuel oil and some remarkable results were obtained in burning such substitutes as asphaltites, wood charcoal, petroleum coke, wood gas, bran, linseed oil, etc. The installations for burning these were made locally and made it possible to produce the necessary amount of cement without any reduction in quality. Today most of the plants have, however, returned to the use of fuel oil but its high cost—$110.00 per ton—makes it necessary to effect all possible fuel economies. Many improvement programs are planned but these await the day when deliveries of equipment can be received in a reasonable time and at a lower cost, according to one large producer.

**Germany** Next to food the production of cement became probably the most important problem of the authorities in the British Zone of Germany late in 1946. Here again the lack of coal is the reason why the production of cement was averaging less than one-third the capacity of the industry in this section which is estimated at about 270,000 tons monthly.

**Hungary** The cement industry in Hungary is also said to be operating at reduced capacity although no up-to-date figures are available. Apparently little difficulty was encountered in getting ample supplies of coal during the war as production increased from 339,420 metric tons in 1938 to a peak of 597,970 tons in 1942. In 1944 there was a sharp drop in production and the output for the last 6 months of 1946 was only 38,280 tons.

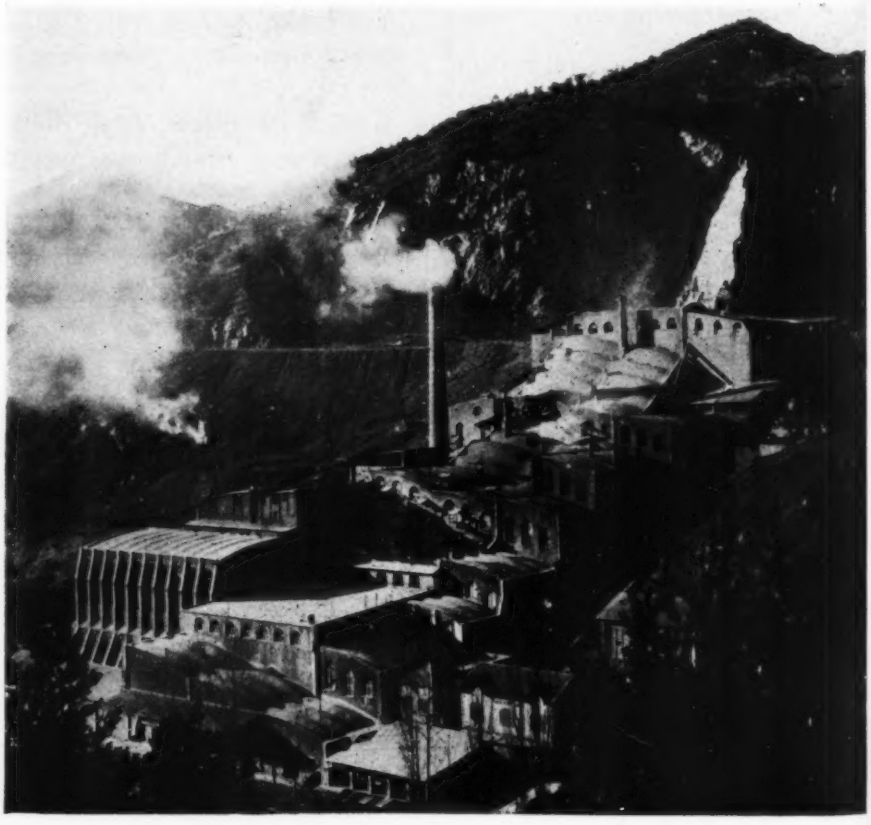
**Spain** Very little of importance has developed in the cement industry in Spain since the article in January but some additional photographs have been received of plants there. Some of these are presented with this article.

**Belgium** The firm of Cimenteries and Briqueteries, Reunies, Belgium, is building a 1,000-metric-ton cement plant with two 11½- by 475-ft. Allis-Chalmers rotary kilns. Open-circuit raw grinding and closed-circuit clinker grinding will be done.

**Norway** According to recent information the cement plants in Norway suffered no war damage but, due to the fact that the plants had to be operated without being able to get replacement parts, much of the equipment is worn out. Because of war damage, in the northern area of the country, however, the demand for cement is very great and the cement companies are installing new equipment and making many improvements.

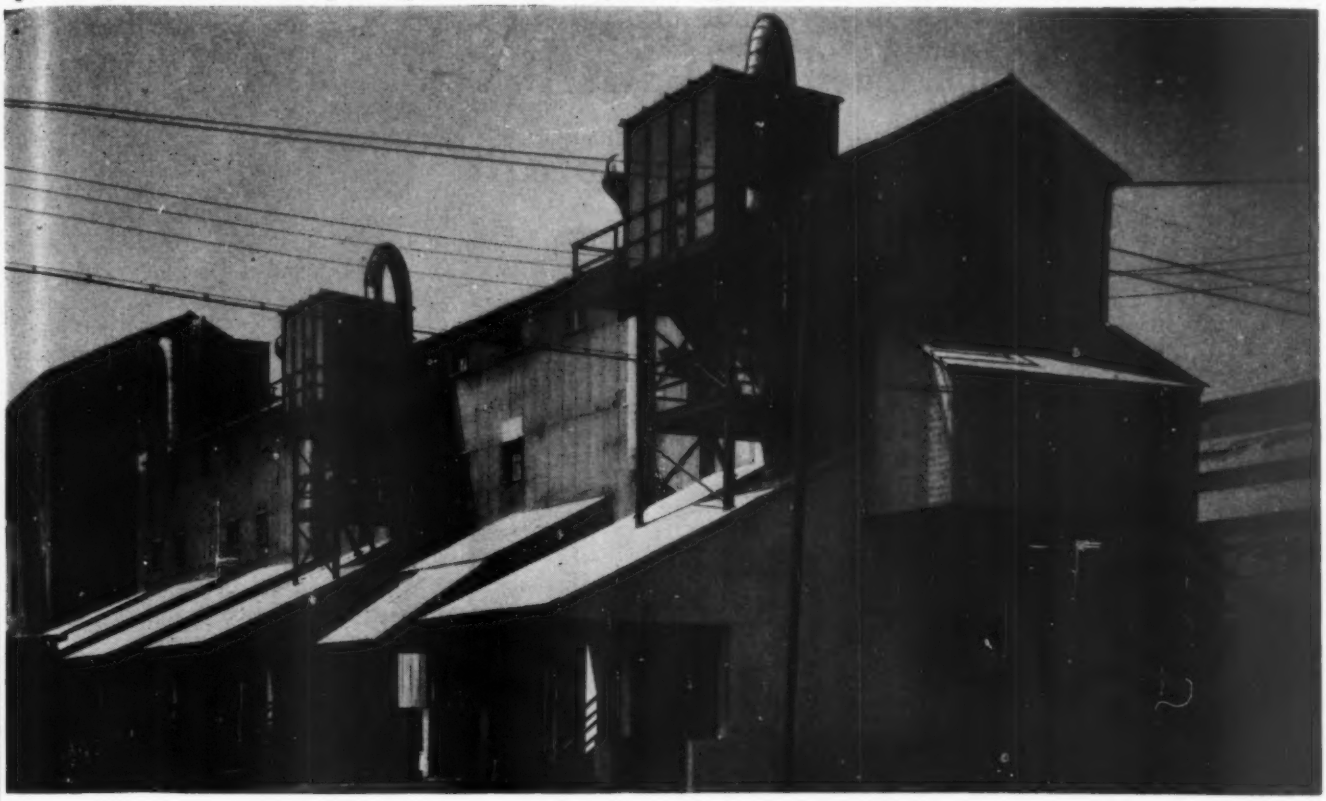
**Russia** Little is known about what has transpired in the cement industry in Russia since the war began but it is reported that the cement plant at Novorossisk in the Caucasus, which was destroyed by the Germans, is being rebuilt and that the first unit has gone into operation.

**French Morocco** The S. A. des Chaux & Ciments de Lafarge & du Teil is installing a 10- by 300-ft., 5-support Allis-Chalmers rotary kiln in its plant near Casablanca, French Morocco. This is an addition to the company's present 2-kiln wet-process plant.



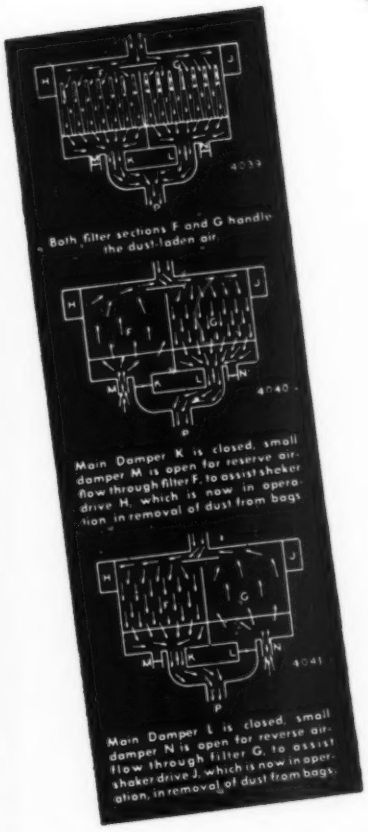
• No. 1 cement plant of Asland at Pobla de Lillet in the Pyrenees Mountains.

● Three Sly Dust Filters Exhausting Packing Machines and Conveyors in a large Cement Plant. This firm has a number of other Sly Dust Filters.



# SLY DUST CONTROL

## PROVIDES AUTOMATIC CONTINUOUS OPERATION


Both filter sections F and G handle the dust-laden air.
Main Damper K is closed, small damper M is open for reserve air-flow through filter F, to assist shaker drive H, which is now in operation, in removal of dust from bags
Main Damper L is closed, small damper N is open for reverse air-flow through filter G, to assist shaker drive J, which is now in operation, in removal of dust from bags.

● In some industrial processes dust control must be continuous —without interruption.

Sly Dust Control Systems provide this feature, when desired, *in addition* to their regular automatic control which eliminates the human element. Details are shown in diagrams at the left.

Sly Dust Filters offer you the following *exclusive* features:

1. Greater filtering capacity because of more filtering cloth
2. Taut bags (patented) save power and improve dust removal
3. Bags more easily replaced
4. Automatic control (any degree) minimizes or entirely removes the human factor
5. Simpler shaker mechanism results in savings in maintenance and operation

Sly's long experience is at your disposal. Ask for Bulletin 98 and tell us about your dust problem so that we may write you fully.

**IN THE CEMENT INDUSTRY, IT'S SLY 4 TO 1**

**THE W. W. SLY MANUFACTURING CO.**
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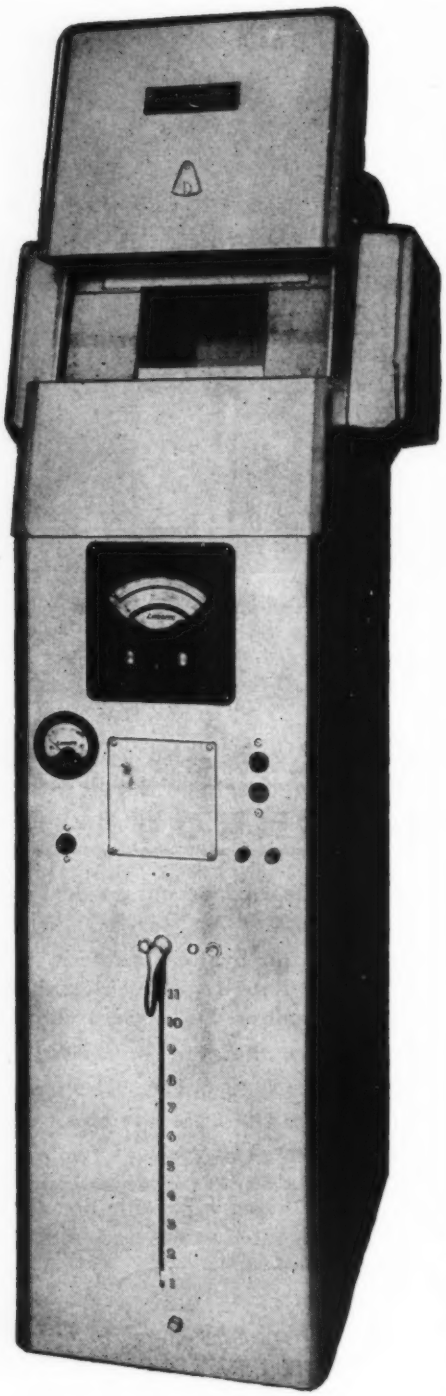
SLY
INDUSTRIAL DUST CONTROL

# *The New . . 2600°-2800° F.* FURNACE

## for laboratory or pilot plant

## *automatically controlled*



**HIGH TEMPERATURES ASSURED**

Here is a package unit with all necessary instruments and accessories in one housing whose overall outside dimensions are 24" wide x 36" deep x 60" high with door closed and 72" high with door open. The furnace shell is heavily insulated with 3000°F heavy brick backed up by magnesium block. There are ten silicon carbide GLOBAR heating elements distributed over top and bottom for uniform heating . . . The generous working chamber measures 12" deep x 6½" wide x 4½" high. It can be used as a box furnace, a muffle furnace or, with diamond blocks, for non-oxidizing neutral atmospheres at elevated temperatures.

**AUTOMATIC CONTROLLER**

The indicating controller pyrometer is entirely automatic and works on the electronic principle. It is protected by double fuses.

**BUILT-IN TRANSFORMER**

The variable voltage transformer is inside, has a capacity of 8½ kw and is used in conjunction with an eleven-point tap switch with handle extending outside in front for convenient manipulation.

**COMPLETE ACCESSORIES**

There is a heavy duty fused line switch, a main line start and stop push-button station, a percentage power input indicator, all mounted for easy accessibility.

**QUICK INSTALLATION**

When installing the equipment, it is only necessary to bring the main line circuit to the fused disconnect switch and the furnace is ready for immediate operation.

*Ask For More Information — Specify B-15930*

**BODER SCIENTIFIC COMPANY**

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PITTSBURGH 22, PA.


**Algeria** Lafarge is also building a new 450-metric ton plant at Oran, Algeria, which will be equipped with a 11½- by 350-ft. Allis-Chalmers kiln, an 840 Compeb mill, screens, crushers, etc. A Pennsylvania reversible hammermill will be used to reduce the cement rock from 6-in. to ½-in. size. This plant will be made as simple as possible to accommodate native labor.

At the Lafarge plant at Pointe Pescade, Algeria, Allis-Chalmers crushers, screens, and mills are being installed to increase capacity.

**Union of South Africa** The Anglo-Alpha Portland Cement Co. in South Africa, is building two new cement plants of 300-metric ton daily capacity each. These plants will each have a 9½- and 11- by 375-ft. rotary kiln and closed-circuit grinding.

**Philippines** Later information has also been received on the government-owned plant of the Cebu Portland Cement Co. at Naga, Cebu, which is the only one now in operation. This plant produced a total of 1,319,524 bags of cement in 1946, and expects to produce 3,000,000 bags in 1947. The output is to be increased gradually through the addition of new equipment and is to reach 8,000,000 bags in 1950. The realization of this program depends on the construction of a new plant which is definitely planned and for which some of the equipment has been ordered. This includes two 11- by 175-ft. Nordberg kilns and two 8½- by 36-ft. 2-compartment mills.

Cement was also produced before the war by Rizal Cement Co. near Manila. This plant was not very badly damaged and orders have been placed for the necessary equipment and supplies to put it back in running order. This plant has a capacity of about 750,000 bags annually.

**Japan** The cement industry in Japan has been somewhat handicapped by shortages of steel grinding balls, bags, lubricating oil, coal and certain spare parts but production in 1946 considerably exceeded that in 1945. The 34 operating plants produced 95,341 metric tons in September, 1946, the last month of record.

**China** In China it is reported that the Shanghai Portland Cement Co. was forced to close its plant recently because of inability to compete with imported cement. Imported cement was being sold for 8,000 Chinese dollars per 50-kg.

# Oxygen ...FRIEND OR FOE?

*(Turbine Oil Oxidation Test)*

**Without oxygen, man cannot live. Yet, reaction to oxygen may shorten the service life and destroy the value of a lubricant!**

**Sinclair is ever alert to the importance of knowing exactly how oils will resist oxidation which can form gums and sludge detrimental to equipment performance.**

**No satisfactory, quick, short time oxidation test methods have yet been developed. Sinclair Research does not compromise. Some studies require continuous tests of 1000 hours. Others, performed with the apparatus above, are run for 100 hours or more.**

**This test — to assure consumers that breakdown and resultant costly repairs due to oxidation will be at a minimum — constitutes one safeguard against inferior product performance . . . just as all Sinclair Research is your assurance that every Sinclair Industrial Lubricant is the very highest in quality.**

*Sinclair Automotive Oils*

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**OPALINE**

**TRUCK BUS TRACTOR**

**OIL**

Superior lubrication in the long pull, under heavy loads

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Keeps engines clean . . .
Sustains top engine performance

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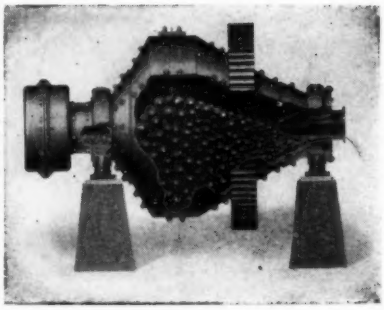
# MILLS FOR EVERY APPLICATION

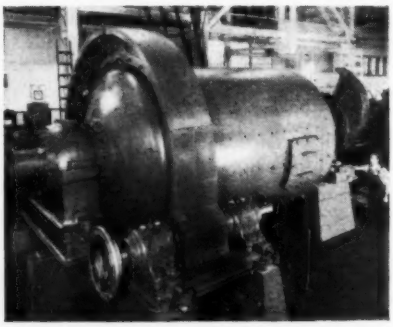


CONICAL MILL

No matter what your grinding problem . . . HARDINGE has a mill to do the job. And . . . forty years of experience in mill work stand behind every Hardinge product.

★ **CONICAL MILLS**

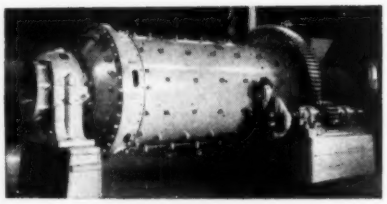
The Hardinge Conical Ball (or Pebble) Mill is unequaled in efficiency. Grinds wet or dry, in open or closed circuit. Outstanding feature: natural size—segregation of grinding media, from feed to discharge. Bulletin 13-D.



CONVEX HEAD MILL

★ **CONVEX HEAD MILLS**

The Cylindrical Ball (or Pebble) Mills have demountable trunnions, and convex heads to reduce head liner wear and increase mixing action. Supplied with or without grates, as required.



ROD MILL

★ **ROD MILLS**

Ideal for producing minimum oversize in open circuit grinding. Grinds either wet or dry. Conical heads reduce friction, prevent congestion of charge at the ends, and align the rods. Bulletin 25-B.

TUBE MILL

★ **TUBE MILLS**

Particularly recommended for producing finished product in open circuit without classifying equipment. Conical heads. Use pebbles, balls or product material itself. Bulletin 18-A.

BATCH MILLS

★ **BATCH MILLS**

Designed for wet or dry batch grinding, as opposed to continuous grinding. Excellent for pulverizing and mixing small quantities of material or special products. Bulletin 19-A.

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bag, ($CN3350 equals $US1) compared to the current manufacturing cost of $CN10,000.

The 6,000-bbl. wet-process plant of the Hwa Sin Cement Co. near Hankow is still under construction.

The China Portland Cement Co., Ltd., with offices in Shanghai and a plant at Lungtan, Kiangsu Province, reports that its plant has been put back into operation but has as yet been able to reach only about half its capacity of 4,500 bbl. daily. The necessary repair parts and materials have been ordered and full capacity operation is expected by the end of the year.

It is also reported that contracts have been placed for the rehabilitation of three cement plants in China at a total cost of $2,000,000.

**Formosa** The Taiwan Cement Corp. has been formed by the Chinese Government to rebuild three cement plants on the island of Formosa. The General American Transportation Corp. has the contract for doing this work.

**India** The capacity of the cement industry in India is to be increased by the construction of a new plant with a capacity of about 300 tons per day. This is to be built at Sindri in Bihar in conjunction with a fertilizer plant which will manufacture ammonium sulphate from Indian gypsum. It is expected that the cement can be sold at a price to cover some of the joint costs and that the price of the fertilizer can therefore be reduced. It is a dry-process plant and will be operated by a diesel power plant. Vickers-Armstrong, Ltd., supplied most of the equipment.

**Ceylon** Construction is said to be under way on a new government cement plant at Kankesanturai, in the northern peninsula of Ceylon, a project which has been in the planning stage for a number of years. The cornerstone was laid July 29, 1946 and the plant is expected to be in operation late in 1947.

**New Zealand** The Milburn Lime & Cement Co., Ltd., Dunedin, New Zealand, operates a 50,000-ton-capacity wet-process cement plant which was built in 1929. Most of the equipment was supplied by Edgar Allen & Co., Ltd., and includes a 9- by 200-ft. rotary kiln, and two 6½- by 36-ft. combination tube mills. The original design of this plant provided for eventual duplication and this is now being considered. The proposed kiln will be considerably larger than the present one and the plant capacity will be increased to 120,000 tons annually.

At present a new combination slurry mill is being installed alongside the present one and will be operated while the original one is being repaired. Later it will be a part of the expansion program.

At present there are three cement plants operating in New Zealand with a total capacity of about 300,000 tons per year. Since the war the demand has been very heavy chiefly due to the housing program, hydro-electric projects, and the growing use of concrete products. There are at present shortages of power, labor and coal but these are being overcome and the prospects for the cement industry seem to be bright.

**Tasmania** No additional information has been received since the January issue on the condition of the cement industry in Tasmania.

---

**Universal Atlas**

(*From page* 101)

The need for the unidirectional current is obvious—precipitation should occur on only one pole.

The pulsating current has no effect, since the electrodes themselves constitute a condenser. This makes it possible to maintain a sufficiently uniform potential between the electrode even though the charging current is pulsating.

The current is applied at a potential very close to that which will produce arcing between electrodes; in fact, this potential is carried at a value so close to the arcing point that an occasional flashover occurs. (In order to prevent this flashover from becoming a power-arc, a balancing resistance is maintained in the transformer primary circuit which produces an immediate fall in potential, due to the IR drop, when an arc occurs, and this in turn reduces the voltage to a point where the arc will not persist.)

The precipitator contains two types of electrodes. First, the high-voltage ionizing electrodes, and secondly, the collecting electrodes.

The discharge electrodes receive the high voltage current from the rectifier, and accordingly must be supported from high voltage insulators. These electrodes are energized negatively, and are made of twisted square rods of steel. These rods must be accurately centered between the collecting electrodes to permit the maintenance of maximum voltage. The sharp edges of these rods facilitate the formation of the corona, which is the "backbone" of the processs.

Once charged negatively, the particles migrate toward the positive collecting electrodes which are grounded. At Leeds, these electrodes are made of ⅛-in. pipe hung in vertical curtains in the path of the gas, which flows through the precipitator horizontally. The dust collects on these pipes, and is dislodged by rapping. This requires that the electrodes be designed so that they will themselves vibrate, permitting effective cleaning. This, of course, requires that the electrodes are not rigidly restrained in their mountings. Hard blows by the rapper are not necessary and tend to be destructive. The Western Precipitation Corporation has developed an automatic valveless air hammer which strikes a heavy blow at relatively low frequency. Using this device, a cylinder is mounted vertically the member to be jarred, and a piston is projected upwards against the head of the cylinder by compressed air at 70 pounds pressure. Exhaust ports are cut in the cylinder wall at a point where they will just be uncovered by the piston immediately before the impact.

This permits the air to exhaust and the piston drops back to its seat. Exhaust air is allowed to escape into the precipitator. This process is fully automatic, with the air being admitted by solenoid valves actuated by a clock timer.


**MERRICK SCALES** have "all the angles" wherever bulk materials are handled on belt conveyors.

*Accuracy*

*Speed*

*Durability*

*Economy*

**MERRICK WEIGHTOMETER** is a precision machine that provides a continuous weight record while material is in transit. It is easily installed, extremely durable, and shows record low operating and maintenance costs.

**MERRICK Feedoweight**

automatically weighs, totals and records the amount of material fed. It also correctly proportions two or more materials in batch or continuous proportioning.

**MERRICK SCALE MFG. CO., Passaic, New Jersey**

*Write for Information*

**For Better Grinding Results**

**For Fewer Replacements**

**For Increased Mill Output**

*Specify*

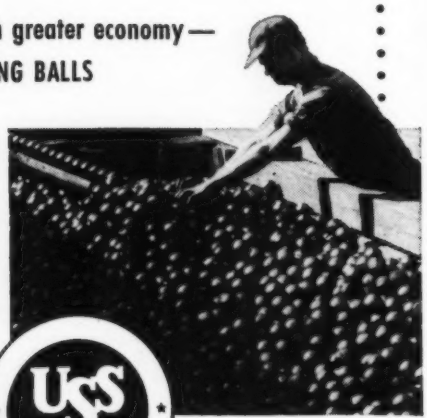
*Lorain Rolled Plate Linings*

QUICK, easy installation . . . long life . . . economical maintenance . . . better grinding results—these are some of the reasons Lorain Rolled Plate Linings are an increasing favorite in many grinding mills.

Available in any diameter or length and in whatever thickness your operating conditions require, Lorain Rolled Plate Linings will produce better results . . . more economically—regardless of what you grind.

U·S·S LORAIN ROLLED PLATE LININGS are available through leading grinding mill manufacturers whose names will be furnished on request.

**. . . and for better grinding . . . with greater economy— specify LORAIN GRINDING BALLS**



Specially made to definite specifications for the grinding industry, LORAIN GRINDING BALLS are being used successfully in both preliminary and finish mills for all types of grinding. Tougher . . . harder . . . long-lasting—they are forged from new steel, accurately heat treated to stand abrasion and impact throughout the longest, heaviest runs.

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*Pittsburgh and Chicago*

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7-575

UNITED STATES STEEL

The dust that falls from the electrodes drops into a steep hopper below the precipitation chamber, and is conducted back to the kiln by a system of screw conveyors.

Although only in operation for a few weeks, the new unit is said to be performing in a highly satisfactory manner, as befits an installation in this modern plant.

### Union Pacific Hires Expert To Cut Damage Payments

Believed to be the first railroad to add a packaging expert to its loss and damage prevention organization, the Union Pacific hired Warren R. White in an additional effort toward counteracting the ever increasing burden of freight loss and damage payments — payments which in the United States in 1946 totaled in the neighborhood of $80,000,000 to $100,000,000.

The first step in Union Pacific's new packaging service is the investigation of reports of container failure. This is usually done personally by the container engineer. After thorough investigation, he prepares a report on the causes of the failure, along with his suggestions for the future prevention of damage to similar shipments.

This report is sent to the shipper. The accompanying letter informs of the damage, describes what occurred, states the analysis of the trouble, and suggests what corrective measures may be taken.

### Lime, Dry Ice to Be Made In New Facilities at Boise

Boise, Ida., is the location chosen by the Idaho Calcium Corporation for a new plant site for the production of dry ice and lime. The firm recently completed a $50,000 processing plant at Mountain Home which has been turning out animal foods, chicken grits and fertilizer from calcium at the rate of 10,000 sacks per month

Both the new Boise plant and the facilities at Mountain Home will use material taken from the company's calcium deposits near Hot Springs, said to cover approximately 800 acres to a depth of 20 to 30 feet. These beds contain about 75,000,000 tons of calcium carbonate testing 97.5 percent. It is estimated that the material will produce 40 percent dry ice and 60 percent lime. The deposit was discovered in 1940 by W. C. Sturgill, president of the corporation.

The Marquette Cement Manufacturing Company of Chicago has reported a net income for 1946 of $1,268,264 and net sales valued at $10,339,475. Last year's net income and net sales were $407,372 and $6,921,400, respectively.

The Standard Gypsum Company of California has announced the removal of its general and sales offices to 3667 Atlantic Avenue, Long Beach 7, Calif.

# Bureau of Mines Announces Winners of Safety Trophies

"Sentinels of Safety" trophies for outstanding safety accomplishments in 1946 were awarded recently to the six mineral operations that had the best accident records in the 22nd annual National Safety Competition sponsored by the U. S. Bureau of Mines, according to Dr. R. R. Sayers, director.

A total of 90 mines and quarries also were awarded certificates of honorable mention for working 30,000 or more man-hours without an accident or for ranking in the next four places after the winner in each of the six classifications of mines.

Four hundred ninety-four mines and quarries in 37 states participated, vying for bronze trophies which are donated by *The Explosives Engineer* magazine. The competition was inaugurated in 1925 to promote safety in mines and quarries.

Final results of the contest for last year also revealed that 100 mines and quarries worked 9 million man-hours without a single accident causing loss of working time by any employee. Describing the annual contests as an effective means of stimulating employee interest in preventing accidents, Dr. Sayers pointed out that the mines and quarries enrolled in the competition usually have better safety records than those not taking part.

Trophy winners in the nonmetallic classifications are as follows:

*Stone Quarries:* The Bridgeport limestone quarry of the Bethlehem Steel Company at Bridgeport, Pa., for working 322,374 man-hours without a lost-time accident.

*Underground Nonmetal Mines:* The Acme gypsum mine of the Certain-teed Products Corporation at Acme, Tex., for working 292,000 man-hours without a lost-time accident.

The frequency and severity rates of injuries for the 6 groups of mineral operations in the 1946 competition are as follows:

| Competition Group | Number of Injuries per Million Man-Hours | Number of Days Lost per Thousand Man-Hours |
|---|---|---|
| Anthracite | 91.053 | 10.898 |
| Bituminous coal | 45.087 | 10.181 |
| Metal | 41.022 | 9.366 |
| Nonmetallic mineral | 34.702 | 8.550 |
| Open-cut | 20.192 | 4.008 |
| Quarry | 18.897 | 1.961 |
| Average, 1946 | 50.577 | 8.785 |
| 1945 | 48.647 | 9.265 |
| 1944 | 47.926 | 8.060 |

The following firms were the winners of certificates of honorable mention for outstanding safety records:

Nonmetallic Mineral Mines

(All these mines operated during 1946 without a disability injury.)

Akron gypsum mine, Akron, N. Y., National Gypsum Company.

Ironton cement-rock mine, Ironton, O., Alpha Portland Cement Company.

Wampum limestone mine, Wampum, Pa., Medusa Portland Cement Company.

Bakerton limestone mine, Bakerton, W. V., The Standard Lime and Stone Company.

Winnfield salt mine, Winnfield, La., The Carey Salt Company.

No. 3 shale mine, Hannibal, Mo., Universal Atlas Cement Company.

Crestmore limestone mine, Riverside, Calif., Riverside Cement Company.

Open-Pit Mines

Columbia phosphate mine, Columbia, Tenn., Monsanto Chemical Company.

Quarries

(All these quarries operated during 1946 without a disabling injury.)

Indiana State Farm limestone quarry, Putnamville, Ind., Indiana State Farm.

No. 5 limestone quarry, Hannibal, Mo., Universal Atlas Cement Company.

Steelton limestone quarry, Steelton, Pa., Bethlehem Steel Company.

Naginey limestone quarry, Naginey, Pa., Bethlehem Steel Company.

Oglesby limestone quarry, Oglesby, Ill., Marquette Cement Manufacturing Company.

No. 4 cement-rock quarry, Nazareth, Pa., Pennsylvania-Dixie Cement Company.

Fort Bellefontaine limestone quarry, St. Louis, Mo., Missouri Portland Cement Company.

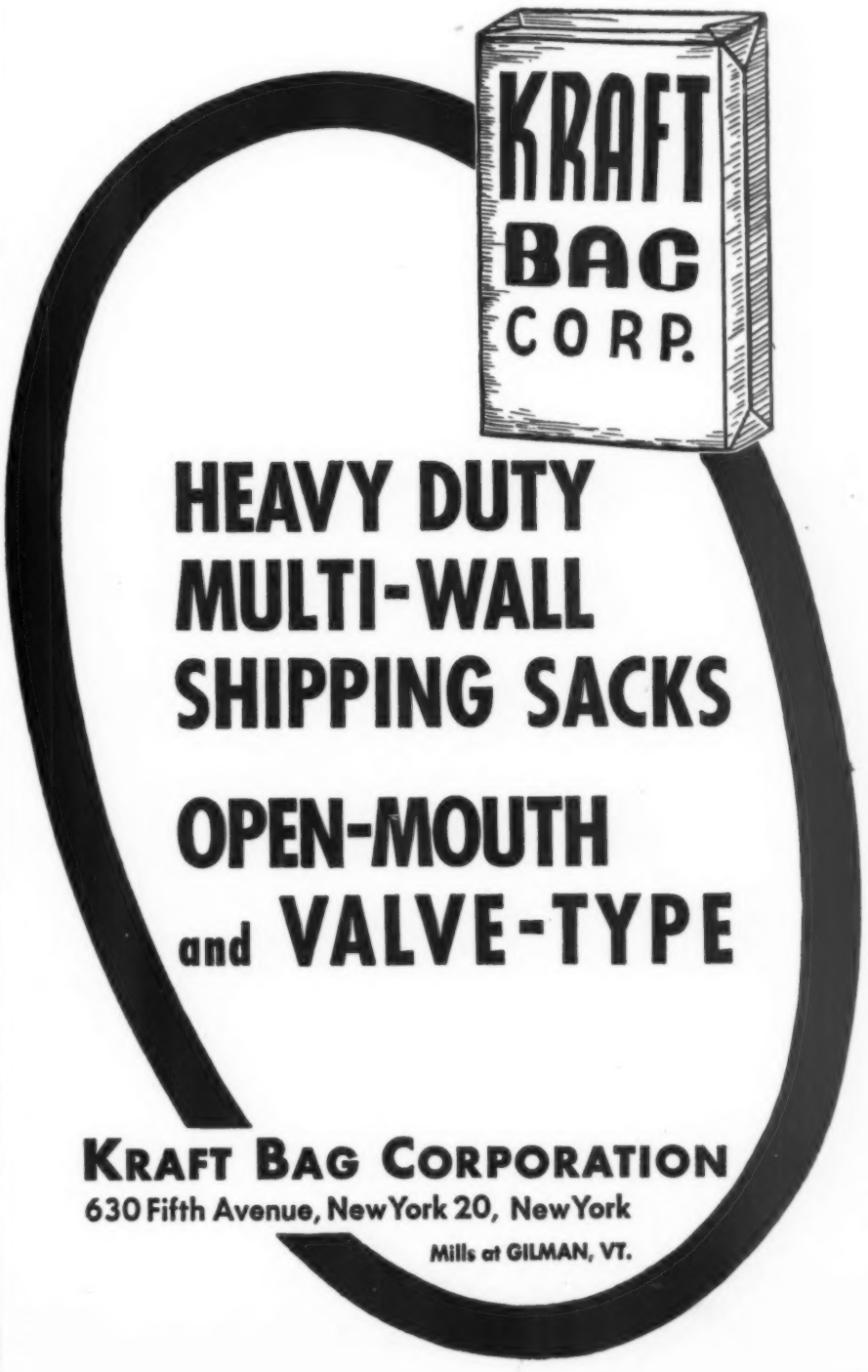
Bethlehem limestone quarry, Bethlehem, Pa., Bethlehem Steel Company.

St. Stephens limestone quarry, St. Stephens, Ala., Lone Star Cement Corporation.

Northampton cement-rock quarry, Northampton, Pa., Universal Atlas Cement Company.

LeRoy limestone quarry, LeRoy, N. Y., The General Crushed Stone Company.

Ohio dolomite quarry, Millersville, O., The J. E. Baker Company.

Nazareth cement-rock quarry, Nazareth, Pa. Lone Star Cement Corporation.
Dallas limestone quarry, Dallas, Tex., Lone Star Cement Corporation.
Oglesby limestone quarry, Oglesby, Ill., Lehigh Portland Cement Company.
Keeport limestone quarry, Logansport, Ind., The France Stone Company.
Lawrence limestone and shale quarry, Lawrence, Okla., Ideal Cement Company.
Inwood limestone quarry, Inwood, W. Va., The J. E. Baker Company.
Sandt's Eddy cement-rock quarry, Martins Creek, Pa., Lehigh Portland Cement Company.
Catskill cement-rock quarry, Cementon, N. Y., Alpha Portland Cement Company.
Holland limestone quarry, Holland, O., The France Stone Company.
Catskill limestone quarry, Catskill, N. Y., North American Cement Corporation.
LaSalle cement-rock quarry, LaSalle, Ill., Alpha Portland Cement Company.
Hercules cement-rock quarry, Stockertown, Pa., Hercules Cement Corporation.
Clinchfield No. 2 limestone quarry, Clinch field, Ga., Pennsylvania-Dixie Cement Corp.
Bellevue limestone quarry, Bellevue, O., The France Stone Company.
Blue Mount trap-rock quarry, Blue Mount, Md., The J. E. Baker Company.
Margerum limestone quarry, Margerum, Ala., Alabama Asphaltic Limestone Company.
Permanente limestone quarry, Permanente, Calif., Permanente Cement Company.
Rochester limestone quarry, Rochester, Minn., Rochester State Hospital.
Marquette limestone quarry, Cape Giradeau, Mo., Marquette Cement Manufacturing Company.
Winchester trap-rock quarry, Winchester, Mass., The General Crushed Stone Company.
Lone Star limestone quarry, Hudson, N. Y., Lone Star Cement Corporation.
Middle Branch limestone quarry, Middle Branch, O., The Diamond Portland Cement Company.
Eagle Ford limestone quarry, Eagle Ford, Tex., Trinity Portland Cement Company.
Union Furnace limestone quarry, Tyrone, Pa., Warner Company.
Plainville No. 4 trap-rock quarry, Plainville, Conn., The New Haven Trap Rock Company.
Birmingham cement-rock quarry, Birmingham, Ala., Alpha Portland Cement Company.
Union Bridge limestone quarry, Union Bridge, Md., Lehigh Portland Cement Company.
National City gypsum quarry, National City, Mich., National Gypsum Company.
Spring Grove limestone quarry, Spring Grove, Minn., Roverud Construction Company.
Middlefield No. 1 trap-rock quarry, Middlefield, Conn., The New Haven Trap Rock Company.
Metaline Falls limestone and shale quarry, Metaline Falls, Wash., Lehigh Portland Cement Company.
No. 4 trap-rock quarry, Knippa, Tex., Southwest Stone Company.
St. Louis cement-rock quarry, Lemay, Mo., Alpha Portland Cement Company.
Bonner Springs limestone and shale quarry, Bonner Springs, Kan., Lone Star Cement Corporation.
Evansville cement-rock quarry, Evansville, Pa., Allentown Portland Cement Company.
Austin marble quarry, Llano, Tex., Dezendorf Marble Company.
Lewisburg limestone quarry, Lewisburg, Ala., Lone Star Cement Corporation.
Winterset limestone quarry, Winterset, Ia., Pennsylvania-Dixie Cement Corporation.
Genoa limestone quarry, Genoa, O., United States Gypsum Company.
Earlham limestone quarry, Earlham, Ia., Marquette Cement Manufacturing Company.
Cloverbank shale quarry, N. Y., Lehigh Portland Cement Company.

## California Cement Output Shows Increase for 1946

During 1946 the production of cement in California totaled 19,546,336 barrels, valued at $32,403,081 f.o.b. plant, of which 8,782,523 barrels, worth $13,487,-139, came from the five mills in northern California and the remainder from the six in the southern portion of the State.

The 1946 output represented a considerable increase over the 1945 production, which was 15,922,772 barrels, valued at $23,469,027. Shipments of cement during 1946 were made from mills in nine counties to the extent of 20,159,380 barrels, as compared with 15,864,134 barrels in 1945.

The annual capacity of California's cement mills, according to the U. S. Bureau of Mines, was 25,770,000 barrels, as of January 1, 1947, as compared with 27,740,000 barrels for January 1, 1946.

## Oregon Portland's Expansion At Oswego Nears Completion

Completion of the $870,000 expansion project now under way at the Oswego plant of the Oregon Portland Cement Company is reported by officials to be a matter of weeks. The cost of buildings erected was $290,000, and the remainder of the sum was spent for machinery and equipment.

It is anticipated that the output of the modernized plant will reach 12,000 sacks of cement, as compared with 6,000 last year. David H. Leche, vice-president of the firm, is in charge of the expansion program.

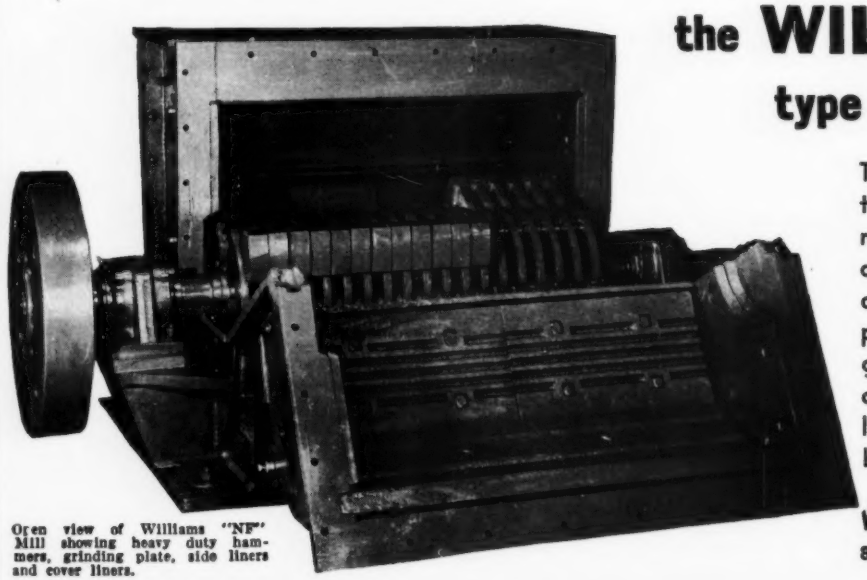
## Casey Stone Company Names Officers and Directors

At the organization meeting of the Casey Stone Company, Inc., held recently in Liberty, Kan., Otis C. Thomas was elected president. Other officers named were Morris C. Montgomery, vice-president and John W. Weddle, secretary-treasurer.

Lawrence Brock, manager, stated that nearly all the equipment had been purchased and that the plant would be in operation within 90 days.


**For Crushing 6" or Smaller Limestone to 1¼", ¾" or Agstone...**

**the WILLIAMS "NF" type HAMMER MILL**



Open view of Williams "NF" Mill showing heavy duty hammers, grinding plate, side liners and cover liners.

The Williams "NF" Hammer Crusher is the outstanding machine in its field for reducing 6" rock to 1¼", ¾" or agricultural limestone. Built in a large range of sizes with capacities from 3 to 75 tons per hour. Features include adjustable grinding plate, hammers adjustable to overcome wear, 2" top liners, 1" side liners, hinged cover, heavy duty roller bearings.

**Williams Patent Crusher & Pulverizer Co.**
802 St. Louis Ave. St. Louis 6, Missouri

WILLIAMS PATENT CRUSHER & PULVERIZER CO. ST. LOUIS, MO. U.S.A. THE TRADE MARK REG. U.S. PAT. OFF.

WILLIAMS
OLDEST AND LARGEST BUILDERS OF HAMMERMILLS IN THE WORLD
PATENT CRUSHERS GRINDERS SHREDDERS

# INSTRUMENTATION AND CONTROL IN THE LIME INDUSTRY*

By JOHN R. GREEN
Manager, Steel and Ceramic Div., Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co.

INCREASED production and reduced costs can be most effectively experienced in the lime industry through use and application of fuel control. This control is possible through instrumentation.

An analysis of the lime industry would seem to point out these characteristics, which have their influence on the application of instruments:

1. Produces large tonnages of a relatively-low-priced product at narrow profit margins.
2. Operates in the quarry and in preparation of raw materials in processes which are not adaptable to instrumentation.
3. Employs labor, principally unskilled and with a minimum amount of technical background even in the ranks of plant supervision.
4. Uses the burning process which for a salable product does not require extreme precision comparable with the standards of other industries.
5. Experiences fuel costs as a major item in total production costs.

The fact that profits per ton are small in the lime industry means that even a small decrease in the cost of firing represents a material increase in total profits. Individual costs will indicate how many dollars are spent for coal, gas or oil in relation to the tons of salable lime which are produced. These same figures can give each producer the total potential savings represented through modern control at the firing point. Where else in lime plant operations can modern tools be expected to yield a more certain return?

In addition to the "coal pile" which the lime industry purchases and places at the disposal of the operators for producing so many tons of lime, additional means of letting the operator know when, where, and how efficiently he is using that fuel, is the simplest and most direct method of reducing costs.

A recent example of figuring such economies might provide some food for thought.

Glass manufacturing, although an entirely different industry, involves the same fundamental approach to problems as exists in lime and other industrial production.

The average glass tank in the bottle industry produces about 100 tons of glass per day. By usual standards $4,000 to $5,000 worth of instruments are considered better than an average installation for each tank.

The unit we can use as an example was designed to produce only 30 tons per day, but on the most efficient possible basis. Equipment, frankly experimental in nature, was designed to find out just how far precision control could be used advantageously.

As suppliers of equipment we pointed out possible advantages and costs, best methods and best equipment. When it was all added up, we reached an amount of approximately $12,000, or almost 10 times the average investment per normal ton. The plant management took stock, commenting something as follows:

"We realize fully that this is a materially greater investment than normally made for this application, with no definite assurance that all of these items will be of final assistance. However, even if we write off all of this equipment in five years, or even toss it out, it still represents an investment of only $0.17 per ton of product, or three gallons of oil. There is every prospect of saving at least this five percent in fuel as well as increasing our production capacity and quality, our prime objective."

Such economic reasoning of equipment and methods is basically sound.

Now let's take a look at the fundamental requirements which must be met in the burning of lime, regardless of whether rotary or shaft kilns are employed:

1. Stone must be heated to the temperature of most rapid dissociation of carbonates without overburning any of the product.
2. Temperature must be maintained for a sufficient length of time, depending upon the size of the stone.
3. The $CO_2$ evolved must be carried away before the product is cooled below the dissociation temperatures, in absence of $CO_2$.

These requirements in the lime burning process logically suggest the following factors should be measured or controlled where practical to do so:

1. Measurement of product temperature or related gas temperatures. To produce this temperature condition, the following factors may be capable of measurement or control:
   a. Fuel volumes.
   b. Air volumes.
   c. Air temperatures, combustion efficiency.
   d. Combustion efficiency.
2. The time required at calcining temperature is influenced by the following factors:
   a. Temperature distribution as measured at different points.
   b. Rate of product travel, or drawing.
   c. Kiln draft or pressure.
   d. Air and gas volumes.
3. The removal of $CO_2$ is fundamentally dependent upon kiln draft and air volumes. Cooling conditions can be influenced by proper temperature measurements and air volumes.

Let us take these same measurable or controllable factors and see what other industries, using similar designs of mechanical equipment, are doing to increase production and decrease fuel costs.

The operation of rotary kilns and associated equipment in the cement industry is similar in many respects to that of burning lime in comparable units. Although there are some distinctive differences in the burning of lime in comparison to cement, we can see how these same measurable factors, which influence the burning of lime, are handled by an industry using fundamentally the same mechanical equipment.

Figure 1 shows a fairly comprehensive application of instruments and controls to rotary kilns.

At this point it might be mentioned that rotary lime kilns operated by the paper industry usually have far more extensive instrumentation than the balance of the lime industry. This may be due in part to the fact that they are more instrument conscious. They have better technical staffs and supervision. They make better utilization of by-products from lime burning.

You will remember that the first process problem was the measurement of product temperature, if possible. Temperature measurement by means of radiation pyrometers sight-

*Presented at the meeting of Operating Div., National Lime Assn., Hot Springs, Va., May 7-8, 1947.

ed through the firing hood onto the product or kiln wall just as the product has fallen away from it has been used extensively in the cement industry and to a lesser degree on lime applications.

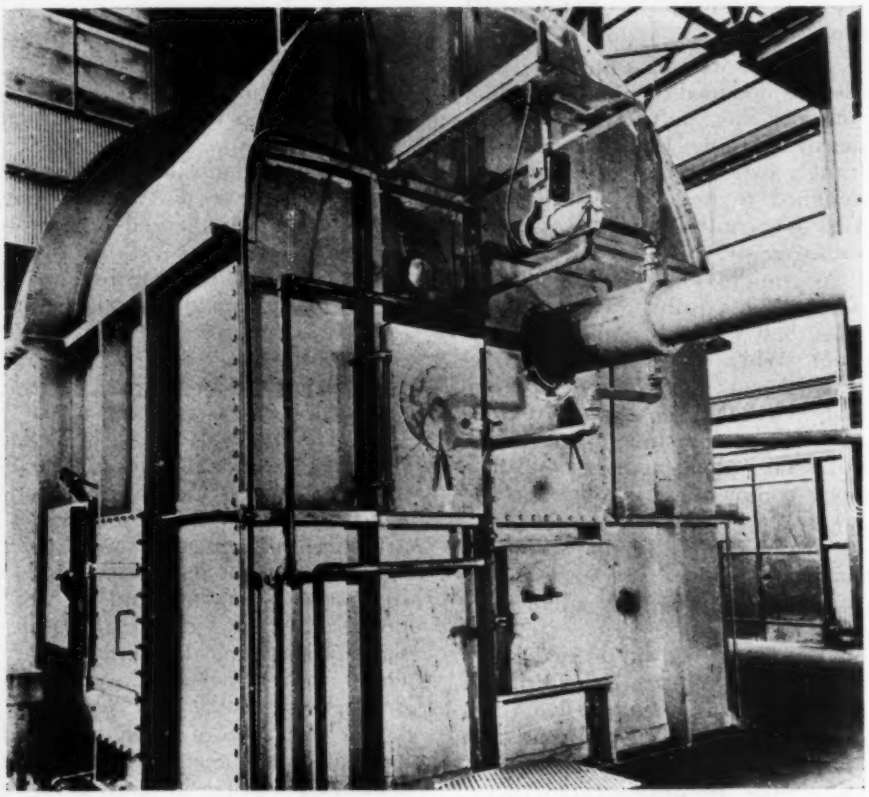
Figure 2 shows a radiation element, mounted on the firing hood, protected by a sighting tube with settling chamber to prevent dust from reaching the lens. A very narrow sighting angle is employed to permit measurement of temperature as far as possible into the high fire-zone, without it being affected by flame temperature. A location slightly above and to one side of the burner, as illustrated, gives least interference from dusting conditions inside the kiln.

By referring to the complete schematic diagram (Fig. 1), it will be seen that measurement may be continuously recorded or used for the automatic control of fuel volumes — powered coal, gas or oil. This method of temperature measurement, applied to lime burning, depends on whether the temperature zone which can be measured by this means is a real operating guide or whether the end of the high-temperature zone is in a portion of the kiln which cannot be reached by this means.

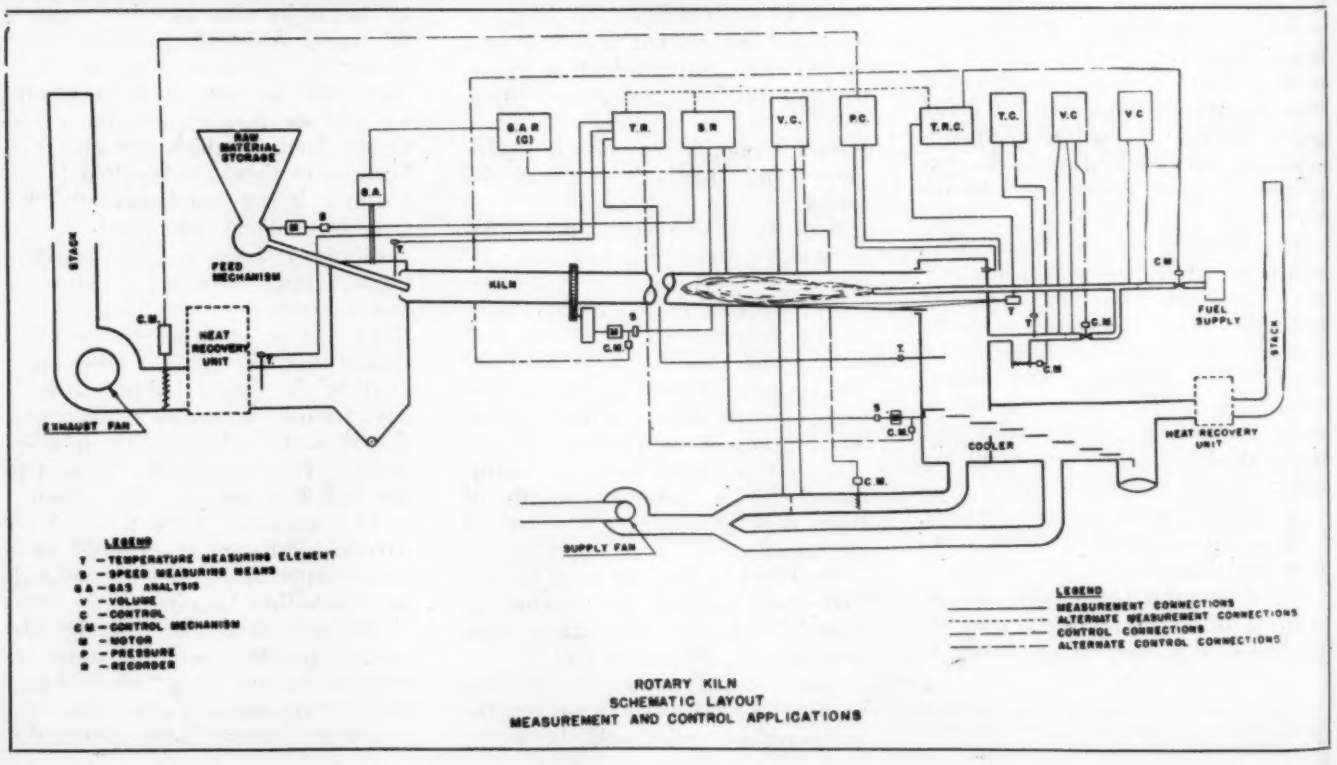
When the latter is the case, it is necessary to resort to thermocouple means with its associated mechanical problems.

Collector rings present maintenance problems in continuously securing good electrical contact. One-quarter - inch - diameter conductors with flat spring-loaded brushes appear to produce the best results. Quick-disconnect couplings for taking periodic readings from thermocouple elements in slowly-revolving kilns serve the purpose of taking occasional check readings. Abrasive action on protecting tubes passing through a kiln load presents still another problem, apparently best solved by the use of nitrated nitrolloy. Generally, such readings do not attempt to take product temperature; they do record gas temperature in the associated region.

By referring to the complete drawing (Fig. 1), it can be seen that the factors influencing the production of this heat include measurement of fuel volumes on a recorded or automatically-controlled basis. For powdered coal firing such a recorded measurement of volume is only practical with wind-swept unit mills hav-



Left: Figure 2. Below: Figure 1.




ROTARY KILN
SCHEMATIC LAYOUT
MEASUREMENT AND CONTROL APPLICATIONS

ing constant-level devices. Gas-fired or oil-fired kilns should definitely record both rate and total consumption of fuel for best firing practice.

The volumes and temperatures of primary air can be measured or controlled, as shown in Fig. 1, either by recording devices or the simplest of indicators.

Secondary air volumes, induced by draft or delivered from cooler mechanism, are more difficult to measure by direct means. The measurement and control of kiln pressure or draft at the firing hood is an indirect method of controlling air volumes, as well as performing a number of other very valuable functions in kiln operation.

The differential measurement between firing hood and atmospheric pressure can automatically control the draft regardless of varying restrictions throughout the kiln length. This is done by regulation of dampers, variable-speed exhaust fans or bleed louvres at the discharge of the kiln.

The mechanics of a device which employs air as a controlling medium, is illustrated in Fig. 3. These units can indicate and detect draft changes as small as one-thousandth of an inch, and rapidly reposition damper mechanism to maintain stable draft conditions.

The ultimate practical solution of air-to-fuel volume ratios, for either manual or automatic regulation of fuel efficiency, can probably be found in analysis of kiln exit gases. Sampling and cleaning problems, although not as difficult for lime as for cement production, still present an additional problem in maintaining continuous operation on gas analyzers.

A number of lime plants in the paper industry have successfully used continuous recording $CO_2$ equipment where this gas is used in supplementary processes. The final answer from the fuel efficiency standpoint is undoubtedly to be found in the perfection of sampling methods and in the development of a practical and trouble-free analyzer for oxygen. Periodic gas analysis by means of inexpensive hand-operated analyzing units is at least worthwhile.

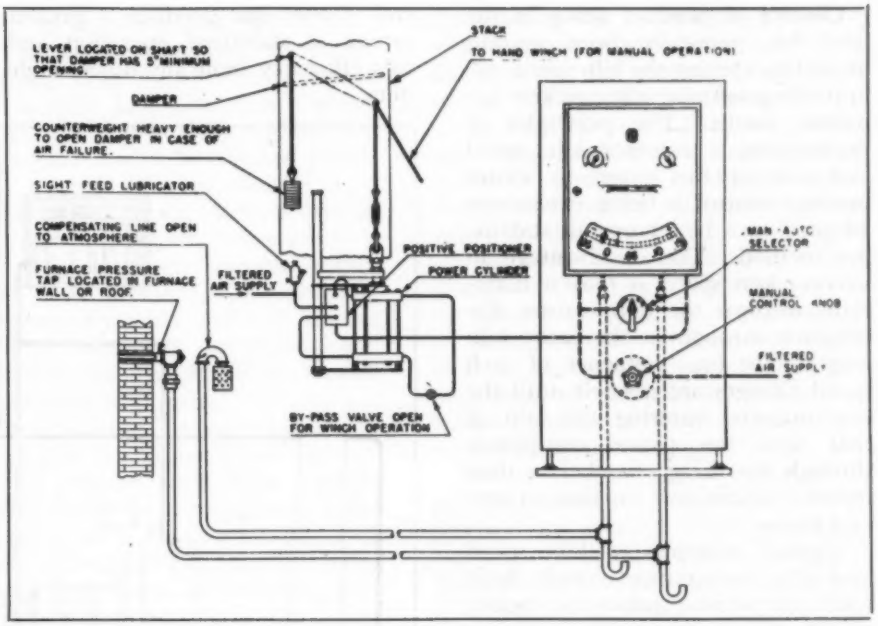

LEVER LOCATED ON SHAFT SO THAT DAMPER HAS 5° MINIMUM OPENING.
DAMPER
COUNTERWEIGHT HEAVY ENOUGH TO OPEN DAMPER IN CASE OF AIR FAILURE.
SIGHT FEED LUBRICATOR
COMPENSATING LINE OPEN TO ATMOSPHERE
FURNACE PRESSURE TAP LOCATED IN FURNACE WALL OR ROOF
FILTERED AIR SUPPLY
STACK
TO HAND WINCH (FOR MANUAL OPERATION)
POSITIVE POSITIONER
POWER CYLINDER
MAN-AUTO SELECTOR
MANUAL CONTROL KNOB
FILTERED AIR SUPPLY
BY-PASS VALVE OPEN FOR WINCH OPERATION

Figure 3.

A very simple and practical continuous measurement to show deficiency of air under certain operating conditions, is illustrated in Fig. 4. The measurement proves where the temperature of the exit gases is high enough to support combustion; it consists essentially of making the kiln exit chamber into a combustibles meter.

Two temperature-measuring elements are used, so connected to measure the difference in temperature. It includes an air volume bled in ahead of one element. If unburned combustibles are present secondary combustion takes place, increasing the temperature of the element. In actual practice both thermocouples should be installed directly in the gas exit from the rotary kiln so as not to be influenced by the infiltration which usually exists around the seal rings. Since the heat losses due to one-half percent of combustibles in the flue gas are equal to those produced by 20 percent excess air, any deficiency of air for combustion represents serious fuel waste.

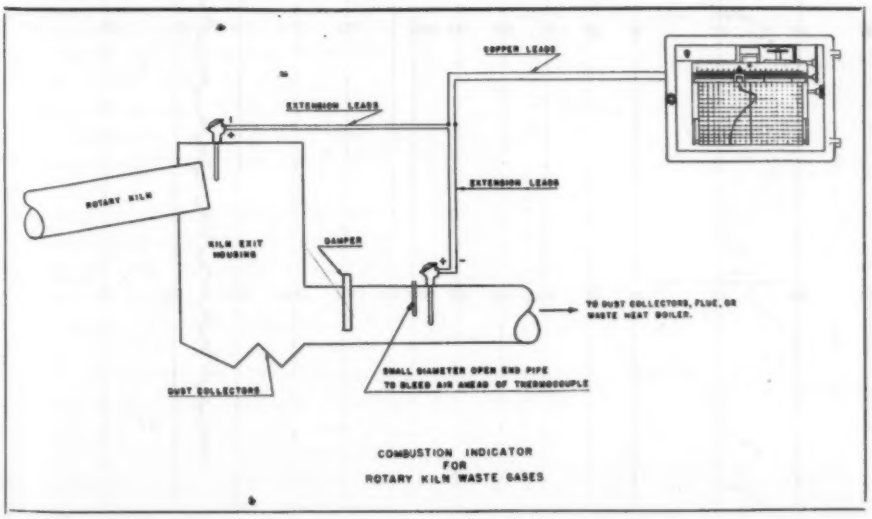
The process requirement for a length of time at the proper calcining temperature is governed by a number of measurements which can be made in a rotary kiln.

In addition to a series of temperature-measuring points throughout the kiln length, the conventional measurement of temperature in the kiln exit housing helps to establish effective temperature gradients.

Automatic kiln pressure control has the greatest influence on stabilizing temperature gradients and distribution which governs the location of the calcining zone. Without control this pressure condition, with resultant shift in temperature gradients, is influenced by wind direction and velocity, volume of fuel fired or barometric pressure.

The other major factor which influences the time in the calcining zone is speed of rotation of the kiln and associated speed of kiln-charging mechanisms. These speeds, obviously determining the rate of the product through the established calcining zone, may be measured and recorded with electric tachometers.

Figure 4.

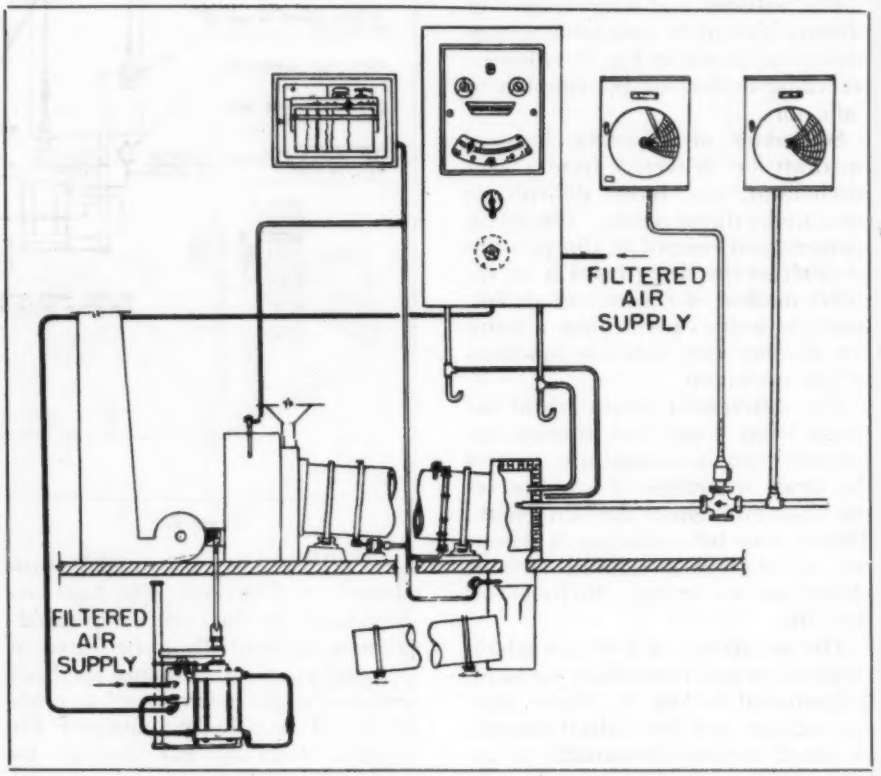

COPPER LEADS
EXTENSION LEADS
ROTARY KILN
KILN EXIT HOUSING
DAMPER
EXTENSION LEADS
TO DUST COLLECTORS, FLUE, OR WASTE HEAT BOILER.
DUST COLLECTORS
SMALL DIAMETER OPEN END PIPE TO BLEED AIR AHEAD OF THERMOCOUPLE
COMBUSTION INDICATOR FOR ROTARY KILN WASTE GASES

Control of product firing in the past has generally been accomplished by varying the kiln speed, admittedly producing the quickest apparent results. The principles of maintaining a constant kiln speed and varying fuel input to secure product control is being extensively adopted as a better overall stabilizing method. The disadvantage in varying kiln speed is that it materially disrupts the temperature distribution throughout the entire kiln length. The final influence of such speed changes are not felt until the raw material entering the kiln at that time has passed completely through the firing chamber, a time interval which may amount to several hours.

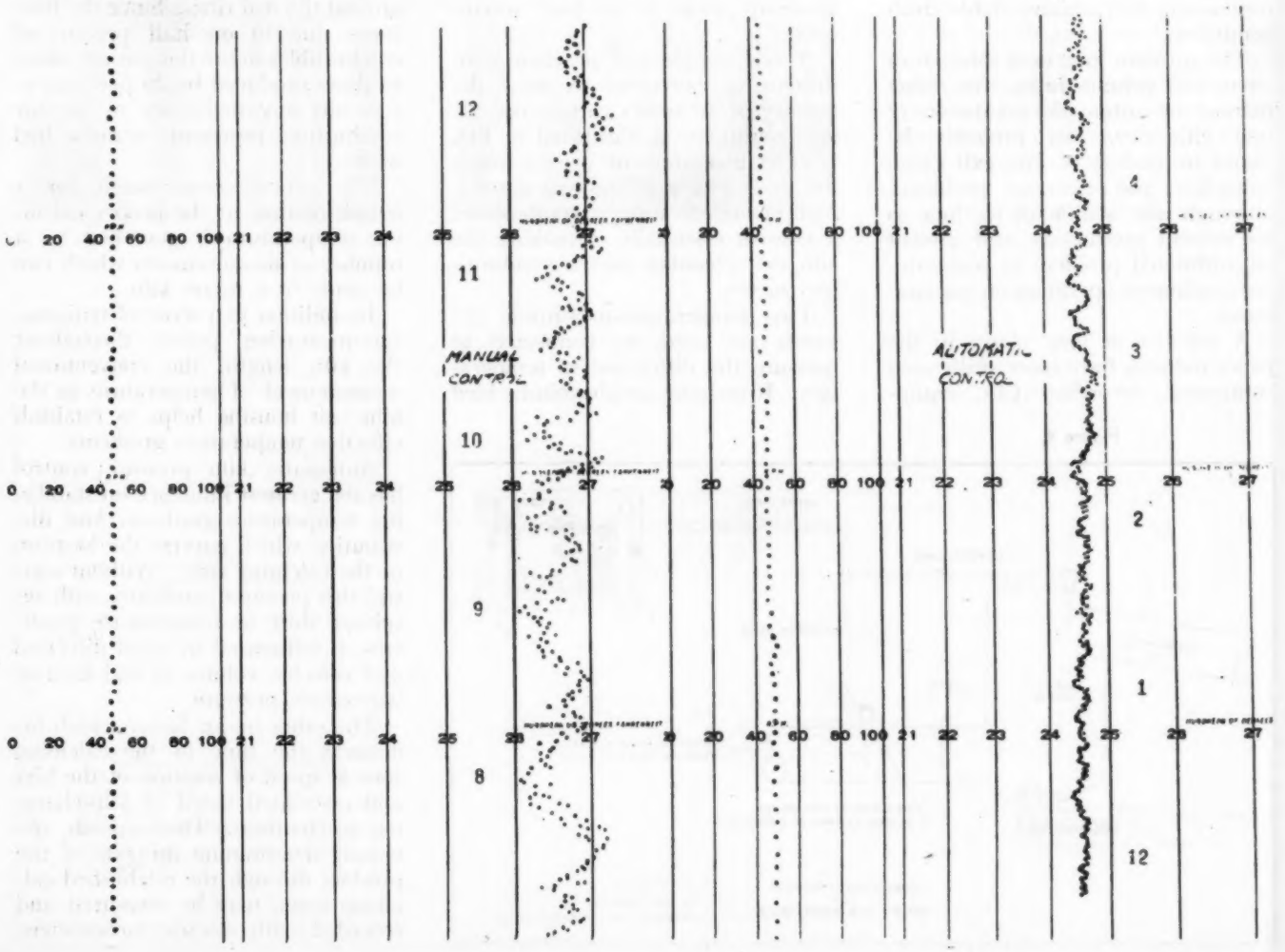
Typical examples of kiln speed and kiln temperature records, both with and without automatic control of kiln temperature (Fig. 5), are taken from cement practice. The temperatures in lime burning would be somewhat lower in range.

The requirement for removal of $CO_2$ gases as rapidly as possible from the product is again tied in directly with automatic furnace-pressure control. For dollar expended, this control system can produce a greater return in stabilized operation and fuel efficiency than any other single item.

The cooling requirement of the product may also involve speed measurement of rotary or grate type coolers which, in turn, has an in-




Below: Figure 5. Right: Figure 6.



fluence upon the temperature of secondary air.

A recent requirement, calling for temperature measurement of the product as it leaves the cooler, facilitates handling and packaging. This requirement has been satisfactorily met by modern instrument designs, permitting these low temperatures to be measured by means of thermocouples which can stand severe abrasive action.

To sum up what might be considered as minimum modern requirements for burning lime in rotary kilns, the accompanying illustration (Fig. 6) shows instrument applications in detail.

The first is a unit to automatically control kiln draft.

For gas or oil fuels a recording flow meter is used to record rate of firing at all times, to totalize the amount of fuel, or as an alternate of at least a record of burner pressure maintained by control valves.

The third unit provides a recording of kiln temperatures and kiln speeds with kiln exit housing. Product discharge temperatures are obtained as desirable additions. A number of these temperature measurements and speed records may be combined on one multiple-record instrument for direct comparison of all associated operating variables.

The burning of lime in shaft kilns presents the same process requirements and factors, all of which should be measured or controlled if possible, even though the mechanical problems are quite different. The tonnage production of these units is much lower and investment ratios, covering both kiln construction and equipment, must be held in balance.

The nearest comparison to this construction and operation in another industry which has taken advantage of modern instrumentation and control is to be found in the blast furnaces of steel plants. Although these units produce between 600 and 1,200 tons of pig iron a day, by comparison with 50 to 75 tons of limestone a day, the basic problems of operation are much the same.

The steel process is semi-continuous, involving reduction rather than dissociation and, although operated at a higher temperature and without danger of over-burning the product, presents many of the lime industry problems in temperature distribution, gas removal and firing constructions. The average instrumentation and control of the modern blast furnace and associated heat recovery units represents an investment of approximately $8,000.

The accompanying schematic drawing (Fig. 7) of a basic design for a shaft lime kiln shows where instrumentation is being applied and what parts might be adapted profitably to shaft kiln operations.

In following the same sequence of factors, product temperature is the first consideration for rotary kilns. The product or hearth temperature of the blast furnace has not been satisfactorily measured, and the same thing might almost be said concerning shaft kilns.

Temperature measurements by means of thermocouples in the calcining zone of shaft kilns presents a difficult mechanical problem if the securing of a reading is to be of any value and at the same time withstand mechanical abrasion at operating temperatures.

The only potential solution to this problem appears to be in the use of modern designs of radiation equipment, measuring temperatures of target tubes installed approximately flush with the kiln lining. Since such measuring elements are entirely external to the kiln structure, the relatively-inexpensive replacements of ceramic target tubes would be minor by comparison to the attempts made many years ago to use platinum thermocouples for this measurement.

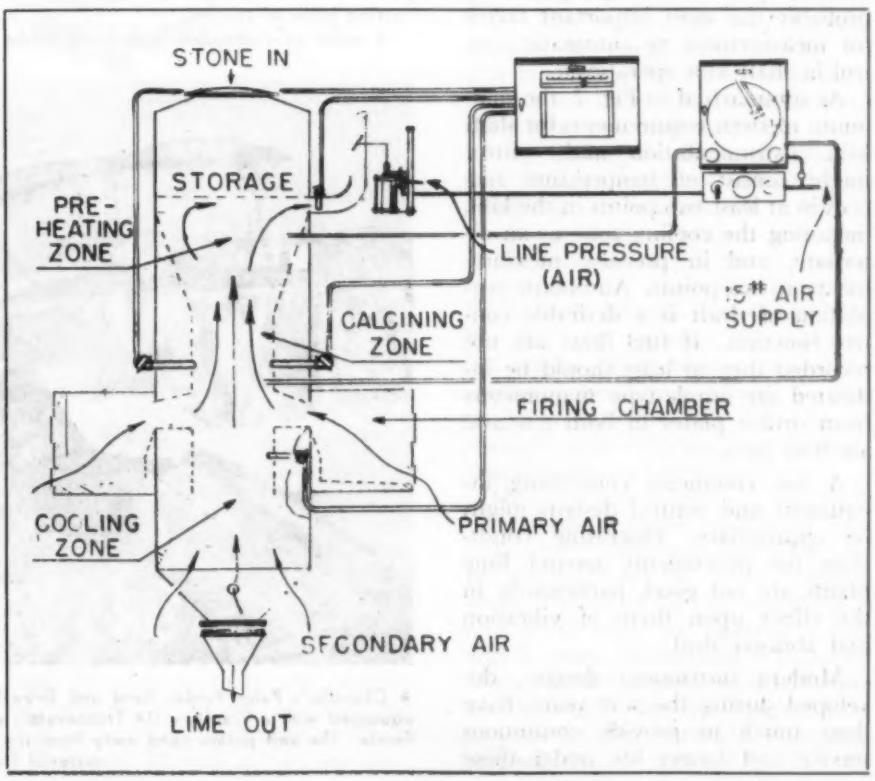
Where external firing chambers are employed a practical relative temperature measurement can be taken in the discharge from the chambers to the kiln proper. Such measurements might be employed efficiently in the automatic regulation of stokers, oil or gas burners.

The blast furnace uses a very precise temperature measurement and automatic control of pre-heated air temperatures, which are similarly admitted to the furnace for combination with the fuel contained in the charge or "burden." Wherever recirculation of gases or pre-heating of combustion air is employed on shaft kilns the same principles of measuring or controlling both air volumes and temperatures might advantageously be employed.

The same recording of fuel rates and measurement of combustion efficiency by gas analysis applies equally well to shaft kilns, except that portable hand-operated gas analyzers are probably the practical extent of present day gas analyzing methods for this application. In addition, however, where gas producers are used as a source of fuel, the automatic control of blast temperature in the producer, as well as the continuous recording of gas temperatures in the producer necks, will aid materially in increasing the efficiency of these units.

The time of calcining is determined by the temperature distribution through the kiln and frequency of drawing. Temperature measurements of the top gas are also used effectively in the regulation of blast furnaces, and certainly should be included among the minimum requirements for shaft kiln operation.

Figure 7.



Blast furnaces also employ another practice which might advantageously be adopted in securing proper temperature distribution in shaft lime kilns. A series of thermocouples are embedded just back of the lining surface, around the circumference of the furnace and at different levels. Comparative measurements secured from these couples are used to prevent channeling of gases or "scaffolding," as it is known in blast furnace operation. When the linings wear away and the thermocouples are destroyed at one level, they simply forget about them and proceed to take readings from the next higher elevation.

In addition to correcting uneven distribution by charging operations, the shaft kiln operator has the advantage of using such measurements as a guide to his trimming operations. The blast furnace makes extensive use of recorded blast pressure (in the range of 15-25 pounds) to show the working condition of the furnace as well as top pressures, which are recorded in inches of water.

As in rotary kiln operation, the measurement or automatic control of draft or pressure throughout the shaft kiln has an important bearing on both time of calcining, as it is affected by temperature distribution, as well as in the most rapid gas removal. In shaft kiln operation pressures throughout the kiln, and at forced or induced fans, are such that a simpler design of pressure measuring or control instrument is entirely practical. Again, this is probably the most important factor for measurement or automatic control in shaft kiln operations.

As summarized in Fig. 7, the minimum modern requirements for shaft kiln instrumentation and control might consist of temperature records in at least two points in the kiln, including the cooling zone as an alternate, and in pressure measurements at two points. Automatic regulation of draft is a desirable control function. If fuel flows are not recorded they at least should be indicated on simple-type manometers from orifice plates in both gas and air flow lines.

A few comments concerning instrument and control designs might be appropriate. Operating conditions for instruments around lime plants are not good, particularly in the effect upon them of vibration and abrasive dust.

Modern instrument designs, developed during the war years, have done much to provide continuous service and longer life under these conditions. Indicating and recording potentiometer pyrometers and tachometers are now available. These operate on electronic principles, thereby eliminating most of the moving parts which are subject to wear. The new instruments are unaffected by vibration conditions.

The word "electronic" need not frighten the prospective user in this industry any more than you are disturbed about the performance of your car radio, which requires no more internal attention on your part and withstands similar or more severe vibration and dirt conditions.

The automatic control instruments shown for these lime kiln applications made use of air pressures as the operating medium. This is purposeful since, in addition to eliminating electric contact problems under severe dirt conditions, the use of air control actually helps in purging the instrument cases. Reasonable precaution is required in cleaning air supply from the small compressors if the plant is not equipped with an air supply.

The education of unskilled labor in the use of instruments is usually a gradual process based upon continued recognition of what these measurements mean and how they can be used to do a better and easier job. Where adequate maintenance facilities are not available at the plant the leading instrument manufacturers maintain various forms of field service. The equipment is maintained on a periodic service basis by instrument factory engineers.

A more extensive use of instrumentation and control by the lime industry can lower fuel consumption, with corresponding increase in profits, as well as securing higher production. Several recent installations in this industry have reported fuel saving in the neighborhood of 1 percent with corresponding increases in tonnage production.

## U. S. Bureau of Mines Tests Churn Drill Performance

The U. S. Bureau of Mines has released a detailed report, "Churn Drill Performance," evaluating the effectiveness of the churn drill in making blast holes.

The churn drill—a long iron bar with a cutting end of steel—is generally operated from a small derrick. The drill is raised by means of a cable and then dropped, followed by a number of successive blows in the same manner. Essentially a crusher, the churn drill depends for its performance upon the foot-pounds of energy it can impart to the cutting edge of the bit.

A series of controlled tests were made at a quarry operated by Consolidated Quarries Corp., at Lithonia, Ga., where rock conditions were consistent in physical characteristics. Tentative results showed that drill speed or a change in the number of strokes per minute and the sharpness of the cutting edge of the drill bit had only a minor effect on drill performance.

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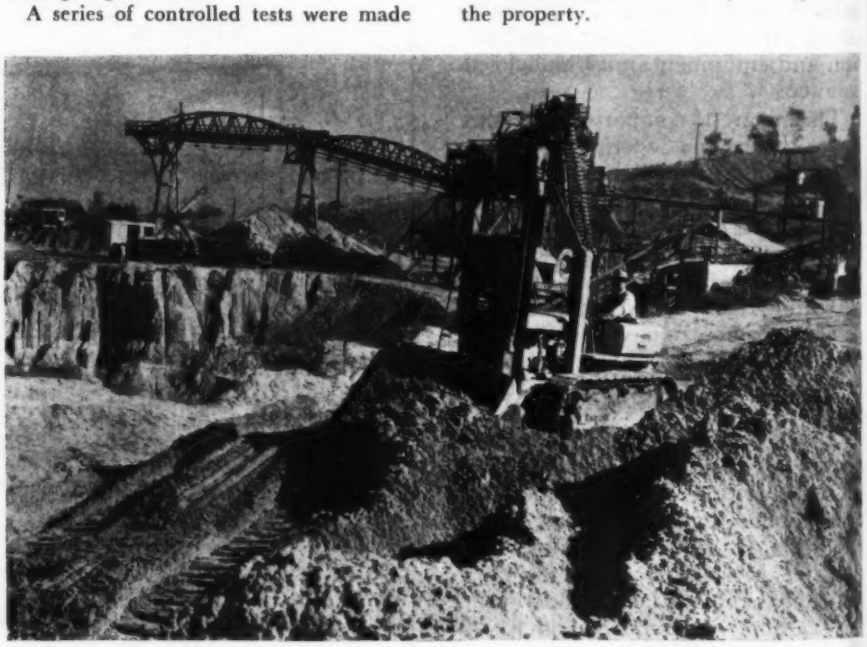
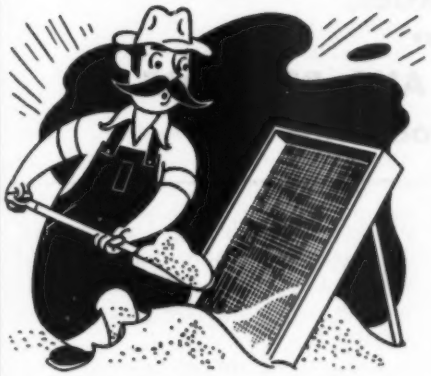
The New Harmony Gravel Company, Ind., was sold under a court order to Edmond M. Richards for $8,050. The business was formerly owned by R. C. Hockman and Leslie Walker. Mr. Walker's death made it necessary to dispose of the property.



• Chandler's Palos Verdes Sand and Gravel Company uses a Caterpillar diesel D4 tractor, equipped with a Trackson IT4 Traxcavator, as a bulldozer in the Palos Verdes hills of California. The unit pushes sand away from the washer and loads trucks with fill dirt and waste material from the washer.

# Screenings



BY *William M. Avery*

IT has already been brought to our attention that the name "Screenings" is not original with us. A British contemporary has a similarly named department (dedicated, however, to rather sober subjects, though you can never be quite sure about Britishers), and for all we know there may be a dozen others lurking in various house organs and trade journals.

Seeking a way around this minor but inevitable complication, we toyed briefly with the not-too-bright notion of spelling it backwards for our small venture, but one look at "Sgnineercs" stopped us cold. Anyway, who the hell wants to be original?

### Horn of Plenty

GRAVEL producers will be intrigued to learn that their industry's most widely publicized personality, Gravel Gertie, had a baby some weeks ago. The little girl, who has been named Sparkle, came into the world with enough hair to stuff a fair-sized mattress. The father, B. O. Plenty, seems to have survived the ordeal in good shape, but last time we looked Gertie was in an oxygen tent, and the future seemed pretty glum.

### Revision of "Where's the Fire?"

DURING the course of our extensive editorial travels in the past few months we've had the bad luck on two occasions to fall afoul of speed traps, each time drawing a fine that suggested the offense was comparable to mayhem, assault and battery or arson. On both occasions we were charged with driving at speeds that would be impressive even on the Indianapolis Speedway; so now, in a belated effort to cut short our career of lawlessness before it becomes chronic, we're inching our way through *all* settled areas at a pace which any self-respecting turtle would scorn.

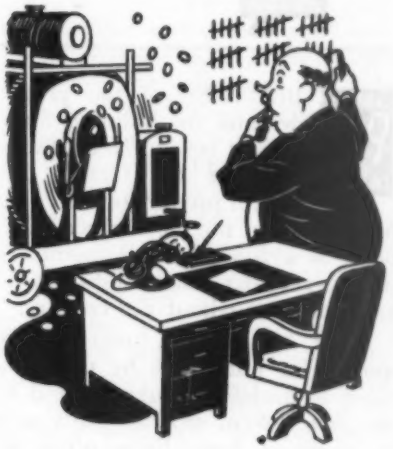
So far we haven't been pulled in for obstructing traffic, but any day we expect some bull-necked flat-foot to stop us and snarl, "Well, chum, where's the funeral?"

### Inside Russia

COMRADE Joe Stalin lifted one corner of the Iron Curtain recently to disclose that on February 12, 1947, a missile fell in Eastern Siberia, creating several dozen craters, the largest of them about 75 ft. in diameter. Now look, Joe, let's not have any *more* misunderstandings. We can produce any number of reliable witnesses to bear out that we were spinning tops over here on February 12, and at no time during the day did we hurl a missile in the general direction of Eastern Siberia. Seems to us like a horrible way to waste a missile, anyway.

### What Price Efficiency?

A WEST Coast bank is reported to have a concrete mixer on its premises for the purpose of unwrapping pennies. Seems that it takes a good many man-hours to perform this heavy chore by hand,



whereas the mixer unwraps a batch in four minutes flat. We've always thought bankers were an inscrutable lot, and this development simply confirms our hunch. Now they'll need two *more* vice-presidents—one to run the mixer and the other to count and rewrap the pennies. Even the W. P. A. overlooked that one.

### Department of Torment

HOPEFUL that we may succeed in getting our four faithful readers to participate actively in this department of PIT AND QUARRY, we propose to throw in mathematical teasers now and then. We promise to stay away from differential and integral calculus, simultaneous quadratic equations and spherical geometry, and you can take part in the fun (if any) without sending in box tops or reasonable facsimiles or 25-word blurbs about why you like PIT AND QUARRY. If you have a favorite brain twister you think we could use, fire it in, only be sure to send the solution; we like to struggle with 'em, too, but our batting average isn't startling.

Here's number one: If you have six sections of chain containing four links each, what will the least cost be to join the six pieces into a single length of chain, assuming a cost of 10 cents for opening a link and 25 cents for welding it together. If you think the answer is $1.75, take another look. See the August issue of your favorite journal for the correct solution.

# THE LIME PLANT OPERATOR

By WOLF G. BAUER
Consulting Engineer

## HYDRATION IN THEORY AND PRACTICE

### Part VIII—Putty Production

another P&Q exclusive

BECAUSE of the present demand for building limes, it may be timely to discuss some of the factors that affect production of lime putty, both in the mechanized putty plant as well as in the thousands of small, every-day slaking jobs in field locations throughout the country.

Some of the best limes can be spoiled for putty uses by the ignorance of unskilled workmen, and by the same token, superior putty may be achieved from limes often regarded as inferior. Since we know that the quality of lime putty is not only influenced by the original stone from which the lime was derived, but also by the burning and slacking conditions, it becomes self-evident that a close link between supplier and user must be established.

Lime is slaked to either a putty or a milky suspension. Very seldom is lime added in such proportions as to give a true solution. Putty finds it chief uses in brick mortar and interior plaster. Putty production should, however, find further uses in the preparation of milk of lime suspensions in the chemical process industries, and this phase will be discussed at a later date, and under milk of lime production. Since very few lime companies operate a putty plant in conjunction with their business, most lime plant operators might ask why they should concern themselves with slaking lime to putty or milk. The answer is simple. Most of their building and chemical limes are further processed in this way. The consumer judges his lime by the end results obtained, and this end result is often influenced very strongly by control factors entirely in the hands of the user, not the manufacturer of the lime. Furthermore, there is surely a moral obligation on the part of the lime manufacturer to assist the user in obtaining the best possible results from his lime. In order to discuss lime reactions and results intelligently with his client

Wolf G. Bauer

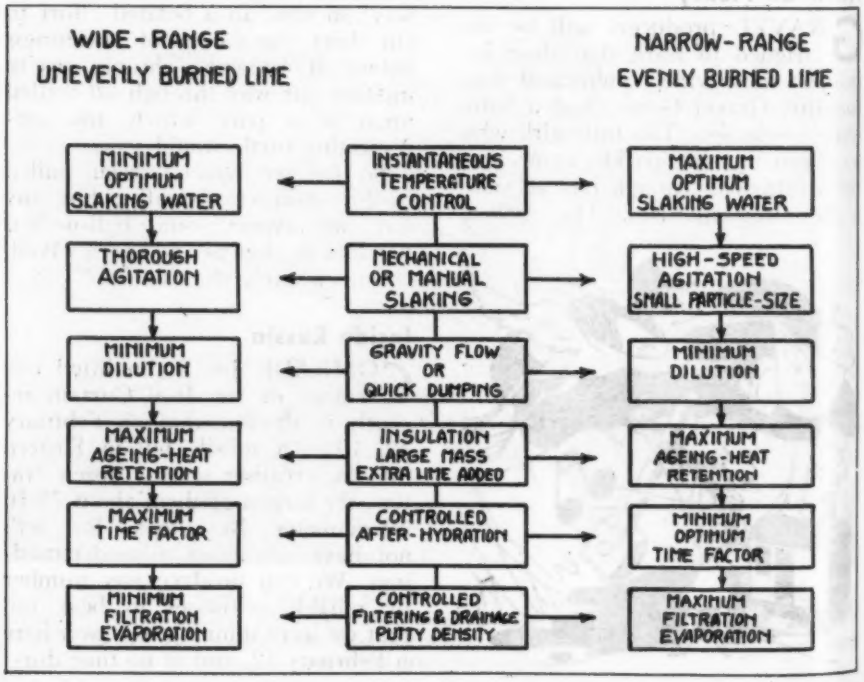
either personally or through his chemist or consultant, he must not only interest himself in the manner in which his product is handled outside the plant, but also instigate the necessary burning and slaking tests to establish the factors under which his product performs to the greatest advantage for the user.

Slaking of lime to putty is one of the really old arts, having been practiced for generations by artisans in many lands. In fact, records indicate, and the ruins of old structures of the ancients show, that lime mortars are still sound and stable in structures that were built 2,000 to 4,000 years ago. Lime hydration is one of the few chemical reactions that may be witnessed by the general public. The spectacular nature of the heat release, disintegration, and steam generation has been, and still is, a source of keen interest and wonder to those who perform and witness it.

In spite of the elementary character of this chemical reaction the very nature of its violence and speed marks it as one difficult to control and regulate.

**Comparisons** When lime is hydrated, roughly 390 B.t.u. per pound of hydrate, or 515 B.t.u. per pound of quicklime are released, regardless of whether the resulting hydroxide forms a dry powder, a stiff putty, or a milk of lime, although approximately another 10 B.t.u. are given off as heat of solution in the latter case. Even though the quantity of heat released is the same, the temperature or heat intensity of the lime mass may vary greatly, depending on the rate of heat absorption. This rate of heat absorption is a function of the quantity of water converted into steam, which in turn depends a good deal on the intimacy of contact between

• Lime treatment for best putty results.



the solid and liquid phases. Since the uniformity and level of the lime mass temperature during hydration influences the characteristics of the resulting putty or milk, the regulation of this temperature is prerequisite to slaking and product control.

In general, slaking lime with sufficient water to produce a plastic putty results in a dispersed hydroxide of small particles, maximum chemical conversion, and minimum of grit with any particular lime. Where theoretical requirements call for about 25 lbs. of lime per gallon of water, a dry hydrate actually requires a ratio of 6 lbs. of lime per gallon, and putty slaking about 3 lbs. per gallon. Some milks of lime may go below one deg. Baumé or 0.1 lbs. per gallon, while cold solutions would require 0.01 lbs. per gallon, and a boiling solution only half this amount.

**Reaction Phases** In order to visualize how the lime-water system reacts during the slaking process for putty production, let us define and examine the phases involved.

Similar to the dry hydration reaction system, solid, liquid, and gas phases exist simultaneously. However, where in dry hydration the gas or steam phase predominates, it plays a secondary role in the wet slaking process. As in dry hydration, water is absorbed by capillary action in the lime, and the air is driven out of the particles. Due to variations in burning (shrinkage and fluxing) of some of the lime, the more porous and reactive lime begins to generate the initial warming-up heat. The hydrate formed in this warming-up stage may be as much as one-fourth of the total hydroxide formed, and is produced under altogether different conditions from that portion hydrated a little later during the peak-reaction stage. The common term of "drowning" may be assigned to the slaking going on at this stage, and the hydrate formed may be inferior to that formed later. (This can easily be determined by placing some quicklime in an excessive amount of cold water, allowing it to hydrate and disintegrate without much temperature rise. The settled lime is then filtered to remove sufficient water to allow a direct comparison with a putty of equal consistency slaked at near boiling temperature.)

Time and increase in water temperature progressively speeds up the reaction rate. If all the lime is evenly burned, the peak-reaction period is short and of high temperature. If the lime grades considerably from highly reactive and soft burned to slow-slaking hard and overburned portions, this peak-reaction temperature will be lower, and the slaking and heat generation will continue at a less vigorous level for a longer period.

**Boiling** Water evaporates from its free surface at all temperatures, the rate of evaporation depending on the temperature (molecular activity) of the water, and the vapor pressure (number of molecule impacts per area) existing at the surface. Bubbling or boiling action is observed as the temperature of the water at the heat generating lime surfaces rises to the point where the water is vaporized to steam, and escapes in the form of bubbles. This vapor or steam must be at a pressure at least equal to the atmospheric pressure above the water. As long as this boiling or vapor escaping process continues at a given pressure, the temperature of the water or milk of lime remains constant. As the concentration of lime in water increases to a mushy consistency, the temperature of the mass may rise above the boiling point of pure water at that altitude, because the molecularly held water films around the colloidal hydroxide particles become more and more difficult to pry loose by heat, and consequently less heat of vaporization is being absorbed. At such a time, the escaping steam may be superheated, and the lime mass temperature will continue to rise above the boiling point.

**Initial Thickening** The amount of slaking water determines the consistency of the lime mass immediately after the peak reaction has subsided. This consistency may range from a thin soup to a stiff, self-supporting putty, depending on the after slaking process used.

It is an unfortunate fact that these conditions of putty consistency, rather than the obtainment of optimum slaking temperature, determine in so many cases the quantity of water used for slaking.

**Putty Set** The common method and practice in the building industry requires that ageing or digesting periods of varying lengths be allowed for purposes of cooling, stiffening, and finish-hydrating the slaked material. The primary purpose is to cause any slow-slaking particles to finish hydration, resulting in a stable product. If the amount of after-hydration is considerable, the slaked lime mass must contain more water than one in which practically all the oxide has been converted. After a period of several days to several weeks, depending on the initial water content, drainage, evaporation, and lime temperature, the lime mass compacts, becomes more dense, and exhibits shrinkage cracks from the surface down into the mass. In this state, the water content has to be decreased from a condition where the hydrate cells were separated from each other past the molecular attraction distance, to one where the capillary forces of the water films exert such tension that the mass is held above the yield-point value, and can support itself without appreciable deformation. This point is one where the thickness of the water films is below one micron and depends on the state of dispersion or flocculation due to ionized or soluble agents.

The stiff and plastic stage is reached through a combination of drying by evaporation, drainage through a porous container, compacting, separation, and the take-up of water through after-hydration. In some instances, the addition of salts and electrolites contributes to the rate and degree of this stiffening or setting-up action of lime putty.

The total water removed by filter or drainage, evaporation, and hydration, is called shrinkage water, as in clay drying, and equals the volume difference between the fully shrunk and set putty and its initial more fluid volume. This rate of water loss decreases rapidly as the capillary forces begin to exert themselves. The more colloidal and plastic the putty, the greater usually the quantity of this shrinkage water, putty volume difference, and the length of time for reaching the final set. It may be noted, however, that in the relatively brief time allowed for putty ageing nowadays (lime putty used to be aged all the way from eight years on down), the most plastic putties never reach their final set volume. Also, in the case of the very plastic limes, their initial relative shrinkage may be more than the less plastic putties, yet their final putty volumes are greater per lime-solids content.

Under the sponsorship of the National Lime Association, Professor Voss of M.I.T. first pointed out this matter of relative water-lime content of putties, from data on putty volume and weight returned by us out in the plants for his purposes. Despite the simple process of determining lime-solids content of putties, putty is still being measured by volume, sold by volume, and proportioned by volume by much of

the building industry without consideration of the actual quantity of binding material involved. The work done at M.I.T. indicated the wide variations in the actual amount of lime solids per cubic foot of putty, and anyone can readily demonstrate the influence of burning, slaking and type of stone from which the lime was derived, on the lime-solids content of the resulting putty. Therefore it will bear repeating that in order to use comparative quantities of lime putty, the weight or specific gravity of the putty must first be determined. This is no different from the practice of blending or proportioning cement-making ingredients or lime slurries by volume, where degree Baumé readings of the slip, milk, or slurry is ascertained.

After a certain amount of water loss, surface cracks or checks begin to appear on the surface of the ageing lime putty. These small checks are caused by the more rapid and earlier shrinkage of the surface, and which is a direct result of the inability of upward capillary water flow to keep pace with the surface evaporation rate. A little later, when the denser dried surface tends to prevent further evaporation in this direction, large vertical shrinkage cracks appear, and evaporation now continues to take place from the surfaces of these. The appearance of these large cracks is often considered a sign that the putty has sufficiently aged. This seems to have no scientific basis, however, as cracking and setting time is not necessarily a function of the degree of after-hydration.

## SLAKING METHODS

It is surprising how many different ideas and practices one finds in the field among operators in charge of and conducting the slaking process for putty production. It is equally surprising to find how little interest, supervision, or cooperation exists between the lime manufacturer and those who use his products.

Complaints and poor putty results often arise from the unwillingness of these slakers to change their technique, or to treat different lime in different ways. It is often difficult for such individuals to realize that almost all competitive limes differ somewhat in certain ways from each other, and that they may have to be handled differently in order to obtain comparative results. The lime manufacturer must run his own comparative tests in order to arrive at a slaking procedure that will yield superior results, which he can specify on his bags or containers in the form of slaking instructions.

**Hand Slaking** Considerable job slaking is still done, especially in the Western states and Canadian provinces. In towns and cities which do not have a putty plant, putty is prepared from crushed quicklime on the job for mortar uses. For plastering, most Western plasterers slake pulverized or processed lime, while many eastern and middle Western contractors use only hydrated lime for this purpose.

Manual slaking is performed in a manner no different from that used thousands of years ago. A wooden box and a perforated hoe are the tools of the trade. Batches of 250 to 500 pounds of lime are generally handled at one time by one or two men. In the last decade, with the advent of pulverized lime, the wooden barrel and steel drum have, in many instances, taken the place of the larger rectangular slaking box. This practice has been fostered by time-saving in eliminating double handling, ease of transportation in small pick-up trucks, and because the putty can be used in the same container in which it is slaked.

There is no point in listing and describing the many techniques that brick masons and plasterers use in slaking their lime. There is much more to be gained by freeing ourselves from old practices and considering the facts we have gathered in our own studies and tests. There is no object, for example, in attempting to improve on a fundamentally poor practice of slaking and then ageing lime in a steel drum.

Manufacturers have had to grind the construction lime to such fineness that any particles of unhydrated lime finding their way into the plaster coat, for example, are too small to cause visible disruption when they expand during after-hydration in the wall.

Lime plant operators should realize, however, that when lime is ground in a roller, ball, or hammermill connected to an air classifier, such classification is not 100 percent perfect, and that profit margins may reduce quickly if 100 percent separation below 325-mesh, 200-mesh or even 100-mesh must be adhered to. It is an unfortunate fact, in this case, that these stray oversize particles are usually composed of the hardest and slowest-reacting lime, the portion that is most liable to cause after-hydration troubles with insufficient ageing.

The plasterers' practice of slaking in steel drums has several inherent faults. First of all, due to the depth of water and confined surface established by the shape of such a container, the reaction of escaping steam is so concentrated that an operator has neither visual nor manual control over excessively hot portions of the mass as they develop. The confined path of escaping scalding steam is not conducive to manual agitation through the opening of the drum. Even though we have pneumatic agitation of the lime and water mixture, such agitation is not uniform, especially near the bottom of the container, where it is most difficult to reach with an agitating tool. Due to the small surface area for surface evaporation, and the fact that no drainage can take place through the walls to filter off the excess water, the lime is generally slaked with less water than best practice indicates for temperature control. Furthermore, a steel drum also allows the so-necessary after-hydration heat to be lost rapidly, especially so because the slaking batches are small, and the steel cooling wall surface is large.

Today's tendencies in hand slaking seems to be to use too little water in order to have the putty set up more quickly. With some limes having a wide range of slaking rate, this practice may be condoned, while with those exhibiting a narrow range, and therefore more violent reaction, this practice results in variable quality, and much gritty and often rubbery putty. The illustration attempts to show in a more connected way how the two given lime groups must be treated for best results. Too little water means loss of heat in steam, and therefore insufficient heat available for after-hydration. Too much water means loss of temperature, which again reduces the effectiveness of after-hydration.

It is obvious that a wide-range lime is best suited for hand slaking, but that such lime requires longer ageing and after-hydration time, which is difficult to provide on job locations of modest size construction. By the same token, narrow-range lime is more difficult to control. If slaked correctly with sufficient cooling water for its high reaction-peak, such lime requires rapid filtering and evaporation provisions, in order to have it set up in a short time. The solution, of course, is to take this old art out of the hands of the time-pressed and harried masons, plasterers, and contractors, and place it under the responsibility and supervision of the lime plant operator or under that of the independent putty-plant operator. It is certainly high time that this phase of our building technique be streamlined.

*(To be continued)*

# PERSONAL MENTION

Dr. C. L. Knowles

DR. C. L. KNOWLES, who was formerly associated with the General American Transportation Corporation of New York City, has formed a new organization, Knowles Associates, with offices at 19 Rector Street, New York. He and his staff are qualified to handle machine and process design in cement, phosphate and allied operations.

Previous to Dr. Knowles's association with General American he was employed by The Dorr Company of New York.

VIRGIL C. BARTLETT, who has been in charge of the Ideal Cement Company's research laboratory, has been appointed chief chemist of the Union Portland Division at the Devil's Slide, Utah, plant. He succeeds A. E. LUCAS, who recently retired on a voluntary pension after many years of service at the Devil's Slide plant.

FRANK N. PRICE has been engaged as labor relations manager for the Ideal Cement Company, Denver, Colo., according to an announcement released by Chris Dobbins, vice-president and general manager. Mr. Price is the first full-time labor relations man ever retained by Ideal.

W. B. STONE of Princeton, Ky., was recently elected to the presidency of the Kentucky Crushed Stone Association. Other officers elected included BRUCE ISAACS of Lexington, vice-president; J. R. THOMPSON of Frankfort, treasurer; MRS. S. D. PAGE of Burkesville, secretary.

ROLAND WHITNEY, secretary of the Louisville Cement Co., Louisville, Ky., was appointed to the Louisville Labor-Management Committee as a representative of industry.

Mr. Whitney has been associated with the Louisville Cement Co. for 25 years. For the past six years he has been secretary of the firm.

GEORGE W. HANNAMAN was promoted to assistant plant manager of the Mason City, Ia., plant of the Lehigh Portland Cement Company on April 1. Prior to that time he had been plant engineer except for nearly five years spent in military service. Entering the army as a second lieutenant in the Engineer Corps, he advanced to the rank of lieutenant colonel.

DEVEREUX BACON JR. and BEN G. WALLIS are among those recently appointed to new positions in the General Portland Cement Company's Florida Division. Mr. Bacon is sales director and Mr. Wallis is his assistant.

STUART DUNCAN was re-elected chairman of the board of directors at the Marquette Cement Manufacturing Company's annual meeting recently. Also re-elected were the following officers: WALTER WECKER, president; W. W. DICKINSON, vice-president; D. S. COLBURN, vice-president; RICHARD MOYLE SR., vice-president; V. J. HANLEY, secretary-treasurer.

The following new appointments have been announced by the Ideal Cement Company, Denver, Colo.:

CARROLL NORDEAN, who was formerly chief clerk, is now manager of the Surplus Property Division at Mobile, Ala.

DEWITT B. BOONE, who had nine years' experience with the T.V.A., has been appointed to succeed Mr. Nordean as chief clerk at Mobile. He had formerly served as assistant chief clerk.

J. E. MOULTRIE JR. is now plant engineer at Mobile.

E. L. SCHMIDT recently became chief engineer of the Pennsylvania department of highways. He succeeds T. C. FRAME, who retired after more than 28 years of service.

RICHARD E. MARTIN, who was formerly manager of Martin & Sons, a branch of the Central Sand & Gravel Company at Sunnyside, Wash., recently joined his father, E. D. Martin, and brother, Jack, in the operation of the parent company at Pasco, Wash.

Paul B. Fegely

PAUL FEGELY has been named vice-president of the Monarch Cement Company of Humboldt, Kan., succeeding C. A. Brooke, who is retiring.

Mr. Fegely was manager of the Modern Valve Bag Company of Humboldt from 1919 to 1940. Two years ago he was elected a member of the board of directors of the Monarch Cement Company.

WARD MCFARLAND has been named director of the Alabama highway department. His assistant is HERMAN NELSON.

WARREN W. MACK recently retired as chief engineer of the Delaware state highway department to become consulting engineer to the department.

RICHARD M. GLAZIER has been promoted to the position of assistant manager of gypsum and building lime sales of the National Gypsum Company of Buffalo, it was announced by President Melvin H. Baker. Mr. Glazier has been with the company for 11 years and has been manager of the order department since 1942.

J. G. WEST has been named sales manager and H. E. GREEN assistant treasurer of Lone Star's Indiana Division.

Selection of WILLIAM T. HOLCOMB as Nevada state highway engineer, succeeding ROBERT A. ALLEN, effective May 16, was announced by Governor Vail M. Pittman. Mr. Holcomb has been associated with the Nevada highway department for the last 27 years. He started in 1920 as a draftsman and worked successively as testing engineer, chief draftsman, office engineer and manager of the planning and survey department before being named assistant in charge of planning and design three years ago.

DAVID G. PERRY has been appointed industrial engineer for the Washington Brick and Lime Company of Spokane, Wash. He will be stationed at the firm's Dishman, Wash., plant.

PETE T. CROWNOVER, who was formerly associated with the Marquette Cement Manufacturing Company, has been named vice-president and general sales manager of the Cumberland Portland Cement Company of Cowan and Chattanooga, Tenn. Mr. Crownover had been affiliated for more than 25 years with Marquette, which early this year purchased the Cumberland company.

MURRAY D. SHAFFER is now director of highways for the state of Ohio. He will be assisted by FRANK M. WILLIAMS, acting assistant director and chief engineer.

HAROLD B. WILES has joined the staff of the N. J. Zinc Company at Franklin, N. J., as an engineer. He was formerly assistant superintendent of the U. S. Coal and Coke Company's fluorspar mines at Mexico, Ky.

LOUIS WARE, president of the International Minerals and Chemical Corporation, has been named a member of the board of directors of the U. S. Gypsum Company.

K. E. GRIMM is no longer with the Permanente Cement Co. near San Jose, Calif. He has become general superintendent of the Cia Occidental Mexicana, Isla San Marcos, Santa Rosalia, Baja Calif., Mexico.

ROBERT C. JAMES, who was formerly associated with the United Clay Mines Corporation, Hawthorne, Fla., is now affiliated with the Copper Range Company, White Pine mine, Ontonagon, Mich.

J. M. BLALOCK JR. has resigned from the staff of the Battelle Memorial Institute and has joined the Baker and Adamson Sales Division of the General Chemical Co., New York, N. Y.

J. B. LESLIE of Birmingham, Ala., is a newcomer on the sales force of the Gager Lime Company of Chattanooga, Tenn. Mr. Leslie has been active in the lime industry for several years in the Birmingham area.

George E. Henry, Jr.

GEORGE E. HENRY JR. has been appointed sales representative in eastern Arkansas for Marquette Cement Manufacturing Company, as announced by J. L. Quarles, Marquette Southern sales manager.

Mr. Henry was associated with his father in the Henry Builders Supply Company at Walnut Ridge, Ark., before serving with the army in World War II and resumed this connection after his release.

EDWIN M. OTT, chemical engineer in the market research department of the Pennsylvania Salt Manufacturing Company, has been appointed assistant manager of market research.

C. E. LOVEWELL, chief engineer for The Carney Company, Inc., of Mankato, Minn., has been named director of sales for the company's cement division, and C. H. CARLSON has been promoted to manager of sales for the insulation division, according to an announcement released by HARRY E. CARNEY JR., president.

Both Mr. Lovewell and Mr. Carlson will continue under the general supervision of N. A. HOLMER, vice-president in charge of sales for The Carney Company, with headquarters in Minneapolis.

CLAIBORNE C. VAN ZANDT has accepted a position as chief engineer of the Lone Star Cement Corporation, with offices in New York. He was formerly sales manager of the basic industries department of the Allis-Chalmers Manufacturing Company.

OTIS C. THOMAS, a state senator in the Kentucky legislature, has been elected president of the Casey Stone Company. Also named to offices in the firm were MORRIS C. MONTGOMERY, vice-president, and JOHN W. WADDLE, secretary-treasurer.

The appointment of RAY L. ATKISSON as assistant sales manager of the Lone Star Cement Corporation's home office in Kansas City, Mo., was recently announced by the company. For the last ten years he has been a district sales manager for Lone Star in Chillicothe, Mo.

**The Pit and Quarry Directory lists all the important nonmetallic minerals producers, both alphabetically and geographically. It is distributed free only to those listed in it. To all others the price is $15.00 per copy.**

HOWARD WHEATON was recently named vice-president and general manager of the Uruguay Portland Cement Company of Montevideo, Uruguay. Mr. Wheaton, a native of Iola, Kan., has been associated with the firm for many years.

J. S. SMALLING, a sales representative for the Gager Lime Company of Chattanooga, Tenn., for the last 11 years, has been made assistant sales manager of the firm.

JOHN D. SULLIVAN, assistant to the director of the Battelle Memorial Institute, Columbus, O., has been named national president o fthe American Ceramic Society.

HOWARD W. ADAM has been appointed to the staff of the Batelle Memorial Institute of Columbus, O., where he will be engaged in its minerals research activity.

FRANZ AGNEW has been appointed sales director for the Corvallis Sand and Gravel Company of Corvallis, Ore. He will handle the sales of rock products and building materials for the firm.

Universal Atlas Cement Company has announced appointments for the following:

DAVID S. DAY, sales manager, Duluth, Minn.; PATRICK F. MORRISSEY, district sales manager, Des Moines, Ia.; P. L. BOWLIN, sales manager, Minneapolis, Minn.

Recent changes in the sales organization of the Alpha Portland Cement Company have been announced as follows:

JAMES L. SKELLEY, who has been a sales representative in Iowa and Illinois for Alpha for the last 22 years, has resigned from his duties to accept a position with the McCarthy Improvement Company, contractors, of Davenport, Ia.

K. W. FUELLING, Alpha's representative in the eastern half of Iowa, has been assigned the territory in northwestern Illinois formerly covered by Mr. Skelley.

PHILIP M. HELES of Dubuque, Ia., who served with the U. S. marines in World War II in the Pacific theatre, has been appointed to take over the Iowa territory served in the past by Mr. Fuelling.

GEORGE D. SUDLOW has been appointed distributor sales manager of the American Rock Wool Corporation of Wabash, Ind., manufacturers of mineral wool insulation. Mr. Sudlow was formerly associated with the United States Gypsum Company.

JIM L. GILLIS SR. was recently appointed engineer-director of the Georgia state highway department, to succeed G. T. MCDONALD.

## OBITUARIES

SIR THOMAS HENRY HOLLAND, a leading British geologist and mineralogist, who held many government and educational posts, died on May 17 in England at the age of 78. An exponent of the theory that an Anglo-American embargo on mineral products would serve as a powerful deterrent in case of threatened war, Sir Thomas was the author of *The Mineral Sanctions as an Aid to International Security*, published in 1935.

EDWARD F. FITCH, a former president of the Florida Crushed Stone Company of Jacksonville, Fla., died on May 17 at the age of 70 years after an extended illness. Mr. Fitch retired from his duties two years ago.

MARTIN SWINTEK, inventor of a dredge digging ladder, and a well known figure in the sand and gravel industry for many years, died on May 2 at his home in Eddyville, Ia. He was 73 years of age.

As a superintendent of an Iowa sand and gravel plant early in the century, Mr. Swintek sought for a solution to the vexing problems of suction pipe and nozzle choking. After much research he developed an invention utilizing the traveling chain type of digging ladder, which is now manufactured under his name by the Eagle Iron Works, Des Moines, Ia.

HERBERT H. MEYERS, vice-president of the Virginia-Carolina Chemical Corp., Mining Dept., Richmond, Va., died in that city on May 12 after a brief illness.

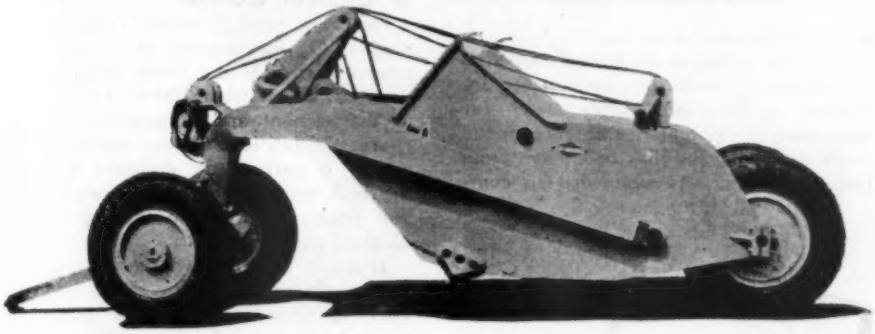
L. S. IGLEHART, 51, secretary-treasurer of the Butler County Stone Company, Inc., of Morgantown, Ky., died in Louisville on April 30 after an extended illness.

THOMAS H. SLATER, 55, who was formerly a sales representative for the Pennsylvania-Dixie Cement Corporation in Western New York, died on May 8 at his home in Buffalo, N. Y., after a brief illness.

FREDERICK KEFFER, 85, who was prominent in the Columbia section of the American Institute of Mining and Metallurgical Engineers, died on March 12 at Spokane, Wash. Mr. Keffer was at one time president of the Canadian Institute of Mining and Metallury and was also elected an honorary life member of that organization. The only other American so honored was Herbert Hoover.

FRANK M. DRESCHER, who had been division superintendent of maintenance for the Colorado highway department since 1932, died recently in Phoenix, Ariz., where he had gone because of ill health. Before becoming a member of the state highway department staff, Mr. Drescher had been a mining engineer in Arizona and Colorado.

# New Machinery And Equipment



Hydraulic or cable-controlled.

## ● Carrying Scrapers

The Kay-Brunner Steel Products, Inc., 2721 Elm Street, Los Angeles, are offering either hydraulic or cable-controlled carrying scrapers in four sizes: 4-, 6-, 8- and 10-yard capacity.

The front apron on these scrapers is designed to carry a portion of the load. When the apron is lifted during unloading, a continuous movement of the dirt is started, facilitating a positive ejection of the loaded material. All sheaves have individual grease fittings to insure the long life of sheave bearings.

## ● Car Mover

One man can easily move two loaded freight cars with the aid of a tool developed by the Advance Car Mover Company of Appleton, Wis. The "Power King" car mover utilizes a compound leverage which imparts a forward thrust to the wheel of the freight car, giving an action of rolling the wheel as it pushes.

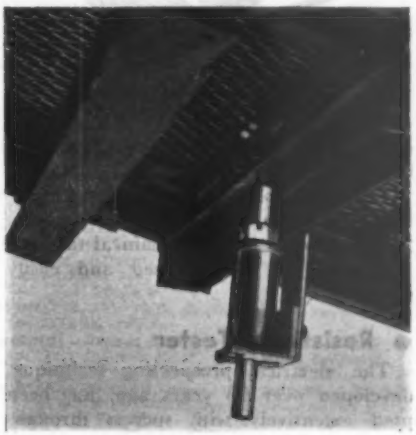
Employs compound leverage.

A design has been developed which does not require guides at the sides to keep the car mover on the rails. Therefore, the tool can be used over frogs and switches and along tracks planked or laid in concrete at crossings. The car mover is constructed of certified malleable castings and is provided with a handle of straight grain hardwood.

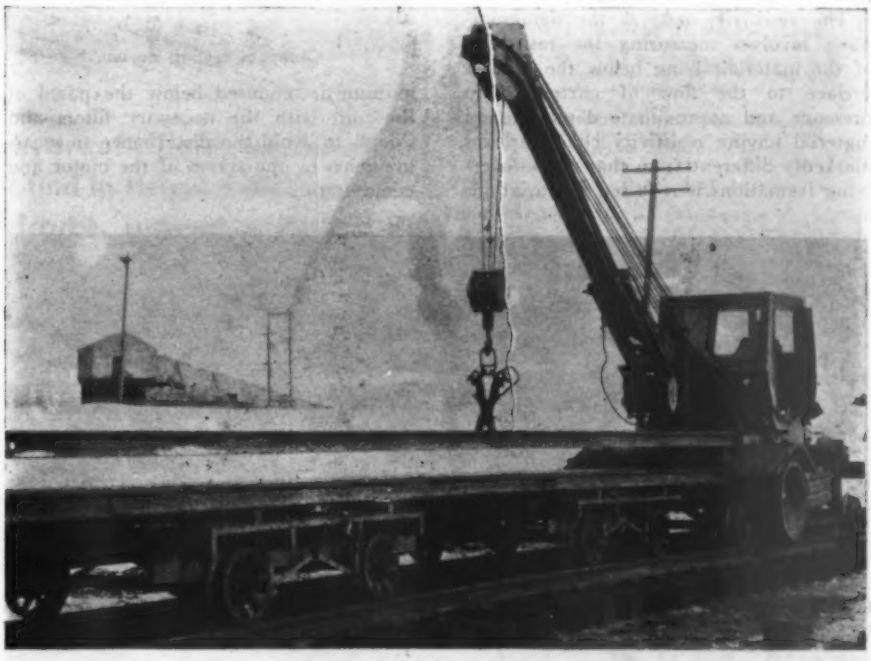
## ● Auxiliary Vibrator

Screen Equipment, Buffalo, N. Y., has developed an auxiliary screen vibrator for attachment to their line of vibrating deck screens to facilitate the screening of damp, sticky clogging materials.

This auxiliary vibrator imparts additional vibration by creating mechanically a hammer blow such as an attendant would do by hand to clear the meshes. Used on bottom deck only.



Creates additional vibration.

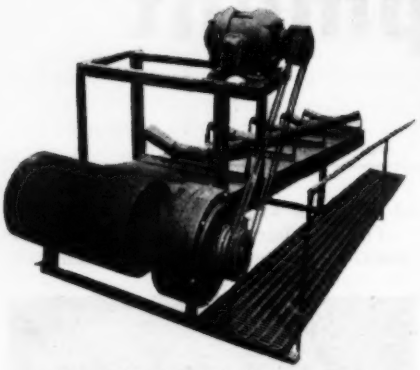


The Silent Hoist and Crane Co., Brooklyn 20, N. Y., has marketed a mobile swing boom crane which is equipped with both retractable flanged rail wheels for work on tracks and standard rubber tired wheels for road travel. Known as the "Rail-O-Road Krane Kar," the unit can move any load up to 10 tons. Equipped with either a gasoline or diesel engine, the unit has a maximum speed, in either direction, of 15 m.p.h.

## ● Speed Reducer

Frank A. Kremser & Sons, Inc., 3435 North Fifth Street, Philadelphia 40, Pa., are featuring an enclosed speed reducer and a non-skid catwalk on their conveyor equipment.

These conveyor units incorporate an all-steel neoprene-sealed, pre-greased, conveyor idler. It is claimed that no greasing is required for the life of the bearing.



For cutting speed of conveyors.

Conveyors of 100 ft. or longer are equipped with an automatic take-up. Shorter models use a mechanical take-up. All parts are standardized and easily replaceable.

## ● Resistivity Tester

The electrical prospecting technique, developed over 20 years ago, has been used extensively with success throughout the world for the determination of sub-surface sand and gravel deposits.

The "Gish-Rooney Resistivity Apparatus," manufactured by the Geophysical Instrument Company, Arlington, Va., represents the latest development in electrical prospecting instruments.

The resistivity test, as the name implies, involves measuring the resistivity of the materials lying below the ground surface to the flow of current. The presence and approximate depth of any material having resistivity characteristics markedly different from that of the overlying formations is revealed in variations of the instrument readings.

The apparatus, as illustrated, embodies the necessary measuring instruments, including a precision potentiometer for measuring the potential difference in the earth set up by the flow of current from the electrodes. A motor-driven commutator is mounted below the panel of the unit with the necessary filters and shields to avoid the disturbance to measurements by the action of the motor and commutator.

Capacity: 100-110 barrels.

## ● Cement Carrier

Hercules Steel Products Corporation, Galion, O., has introduced a new bulk cement carrier Model 100-B which transports a load of from 100 to 110 barrels of dry cement and is powered to discharge the full load in four minutes. The carrier is particularly designed to haul dry bulk cement from mill to warehouse and from warehouse to the job or individual contractor.

Hercules has designed the body of the new cement carrier with three manhole filler openings, each having a hinged cover with manual locking device and fitted with a tubular rubber gasket. The discharge door at the rear end of the body is equipped with a circular door, also fitted with a rubber gasket to prevent leakage. Operation of this door is by a threaded shaft which is turned by a large handwheel, thus offering control of the rate of discharge. The discharge chute is fully enclosed.

Compact testing device.

## ● Motorized Scoop

The new model "B" Scoopmobile, incorporating several new improvements, is now being delivered by Mixermobile Manufacturers, Portland, Ore. Scoopmobile is a tricycle-type materials-handling machine. Control of the bucket is accomplished be means of two hand levers which regulate a new pick-up, hoisting and discharging mechanism. It is possible for the operator to pick up a full load from a stock pile without shock loading.

The design of the bucket has been changed to eliminate spillage over rough terrain. Partial loads can be discharged because the bucket can be placed at any angle and closed at any time during discharge operation.

Tricycle-type carriage.

Shutdowns for the removal of clinkers from lime and refractory kilns are eliminated by the use of this kiln gun, a product of the Western Cartridge Company, division of Olin Industries, Inc., East Alton, Ill. The 8-gauge smooth-bore gun fires a 3-ounce lead slug, cutting a slot through the ring, which falls in when the kiln resumes operation.

**HERCULES** *has the design and construction features you're looking for!*

- REINFORCED STEEL SUBFRAME
- RUGGED UNDER-STRUCTURE
- CENTER-LIFT HOIST
- PISTON-TYPE VALVE
- DASH BUTTON CONTROLS

**THE FEATURES you want in hydraulic hoists and dump bodies are the features you'll find in Hercules-BILT equipment. Reinforced steel subframe, rugged underbody construction, piston-type valve and dash button controls provide better performance and longer service-life. And Hercules-BILT Center-Lift Hoist—lifts 4 inches ahead of the center of the load on an 8-foot body—means smooth, easy lift that's easy on equipment. Check with your nearest Hercules distributor NOW for complete information.**

# HERCULES

## *Dump Bodies and Hydraulic Hoists*

HERCULES STEEL PRODUCTS CORP. • GALION, OHIO

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**MICHIGAN**—DETROIT: Waggy-Hoffman Equipment Co., 14089 Schaefer Hwy. (CHICAGO, ILL.) Stahmer Supply Co., 135 S. LaSalle St.

**MINNESOTA**—ST. PAUL: General Truck & Equipment Co., 2535 University Ave.

**MISSOURI**—KANSAS CITY: American Body & Equipment Co., 1411 Charlotte St. ST. LOUIS: Truck Equipment Co., 511 N. Channing Ave.

**MONTANA**—BILLINGS: Western Construction Equip. Co., 505 N. 24th St. MISSOULA: Western Construction Equip. Co., 218 W. Pine St.

**NEBRASKA**—LINCOLN: Highway Equip. & Supply Co., 21st & N Sts. SCOTTSBLUFF: Colorado Builders Supply Co., 602 W. 27th St.

**NEW MEXICO**—ALBUQUERQUE: The Harry Cornelius Co., 1510 N. Second St.

**NEW YORK**—BUFFALO: Truckstell-Wilcox, Inc., 224 W. Utica St. TARRYTOWN: Hercules-Campbell Body Co., Inc. WATERLOO: Hercules-Campbell Body Co.

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**OKLAHOMA**—LAWTON: Tompkins Auto Salvage Co., 917 S. Second St. OKLAHOMA CITY: The Diesel Power Co., 1801 N. E. Ninth St. TULSA: The Diesel Power Co., 4th & Elgin Sts.

**OREGON**—PORTLAND: Newell Truck Equipment Co., 316 N. Russell St.

**PENNSYLVANIA**—ALTOONA: Brumbaugh Body Co., 100 Plank Road. ERIE: The Trailmobile Co., 1223 Walnut St. LEBANON: M. A. Brightbill Body Works, E. Cumberland St. at 7th Ave. PHILADELPHIA: Eastern Body Co., 21st & Fletcher Sts. PITTSBURGH: Hercules-Pittsburgh Body Co., 1717 Mary St., S. S.

**SOUTH CAROLINA**—COLUMBIA: South Carolina Equipment Co., P. O. Box 295.

**TENNESSEE**—CHATTANOOGA: Ted Nelson Service & CHR Alignment Co., 416-18 Market St. KNOXVILLE: Knoxville Structural Steel Co., P. O. Box 1512. MEMPHIS: Dealers Truckstell Sales, Inc., 365 S. Parkway, W. NASHVILLE: Halliburton & Lane Co., Fifth Ave. & McGavock.

**TEXAS**—DALLAS: Truck Equipment Co., 2409-11 Commerce. FORT WORTH: Truck Equip. Co. HOUSTON: McArthur Welding & Press Co., 5525 Clinton Dr. SAN ANTONIO: Patten Machinery Co., 1318 N. Alamo St. CORPUS CHRISTI: Truck Equip. Co., 1501 Port Ave.

**UTAH**—SALT LAKE CITY: Hercules Body Sales Co., 2205 Highland Drive.

**VIRGINIA**—NORFOLK: A. S. Drumwright & Co., 1921 Brambleton Ave. RICHMOND: Crenshaw Equipment Co., Inc., 304 E. Main St. WINCHESTER: Schade Equipment Co.

**WASHINGTON**—SEATTLE: Allied Trailer & Equipment Co., 1331 Third Ave.

**WEST VIRGINIA**—BLUEFIELD: Truck Equipment Engineering Co., P. O. Box 387. CHARLESTON: West Virginia Tractor & Equipment Co., P. O. Box 473. CLARKSBURG: West Virginia Tractor & Equipment Co., 100 Wood St. HUNTINGTON: Huntington Truck Equipment Co., 919 Sixth Ave.

**WYOMING**—CASPER: Colorado Builders Supply Co.

In use as a dragline for loading.

## ● Unit for Track-Type Tractors

A combination dragline, clamshell and crane that retains the utility of a track-type tractor equipped with a bulldozer is offered in the "Hystaway," manufactured by the Hyster Company, Portland, Ore. This unit is designed for installation on the D6 and D7 models of the Caterpillar track- type tractors.

Utility use of the bulldozer is possible with the complete Hystaway installed. Full track oscillation is available on a standard tractor and track rigidity can be secured by turning a crank at the masthead.

## ● 4-Rear-Wheel Dump Truck

The Knuckey Truck Company, Connecticut and 17th streets, San Francisco, Calif., has improved the postwar model of its four-rear-wheel chain-drive dump truck. For off-the-highway use, this

Built for heavy duty.

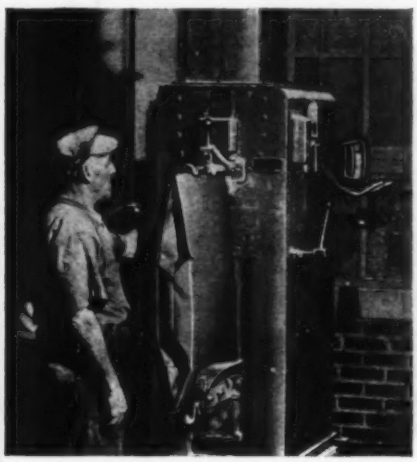
custom-built, heavy-duty truck will carry 22½ cubic yards, with a 125,000-pound gross weight capacity.

The rear driving unit is of the center pivot type. Ample provision is made for flexibility when operating on uneven surfaces. The lateral movement of the dead axles is limited, while proper chain alignment is automatically maintained at all times.

## ● Automatic Filler

A low-cost valve-bag filling machine has been developed by the St. Regis Paper Company, New York, N. Y. The "100-LS" was designed for the packaging of industrial products which because of excessive dust would make manual closing of the container an uneconomic and impracticable operation.

The valve bags are factory closed at both ends, leaving only a small opening or valve in one corner. It is through this valve that the bag is filled. The weight of the contents of the bag automatically



Eliminates dust.

closes the valve at the end of the filling operation, thereby eliminating hand closing methods. A special device on the bag filling machine settles the contents during the filling operation.

## ● Hand-Truck Attachment

Safety in hand-trucking heavy loads is now possible through the new "Universal Tilt Truck Attachment" manufactured by the Melooz Mfg. Co., 1311 West Washington Boulevard, Los Angeles, Calif.

This attachment takes the load strain off the operator and doubles the carrying capacity of any hand-truck. The attachment is readily fitted to both new or old two-wheeled hand-trucks. Made in two sizes, the device rolls the load on three wheels instead of two. It is adjusted to any desired load balance and in full lowered position makes a three-wheel platform of the truck.

## ● Safety Tool

Putting freight car hopper doors back into their locked position after being emptied has been the cause of many serious personal injuries. With this problem in mind, The Industrial Products Company, 3044 N. Fourth St., Phila-

Prevents accidents.

delphia 33, Pa., has developed the "Railroad Speed-Up Tool."

Manufactured of round bar steel, the tool has a drop-forged link and hook at one end, and specially designed "L" on the reverse end. Two notches are provided in the "L" end to prevent slipping.

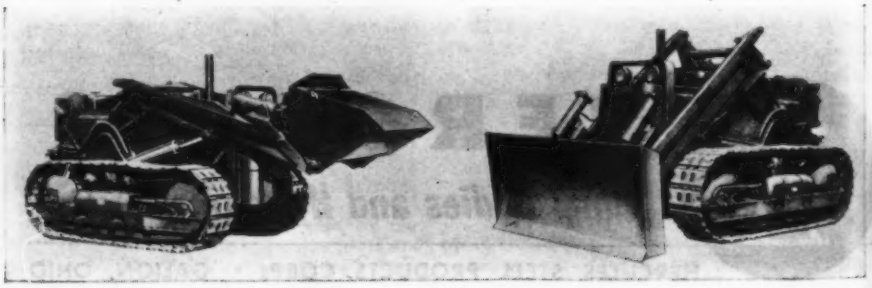
## ● Dual-Purpose Shovel

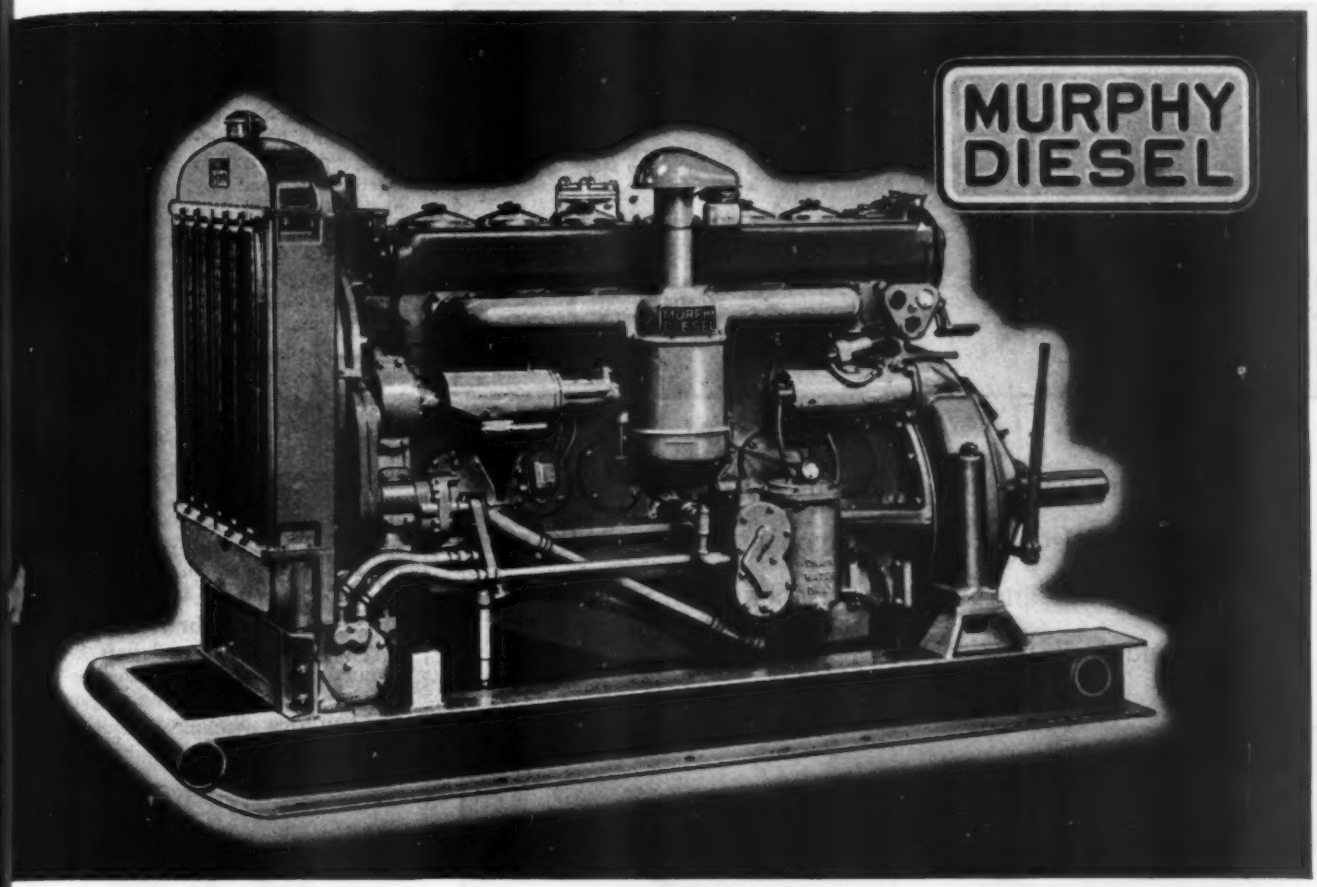
The Frank G. Hough Company of Libertyville, Ill., has announced the new Model 9-A bulldozer-shovel, specifically built into the International T-9 and TD-9 TracTor.

The Model 9-A is a dual-purpose unit and may be equipped with either a full track width 1-yd. bucket or bulldozer blade. Since the Model 9-A was specifically designed and built into the tractor, the original tractor balance, stability and traction are maintained with both blade or bucket.

The bucket is raised, lowered, dumped and relatched entirely by hydraulic control. The bucket tilts back automatically in carrying position, tending to prevent spillage. Overhead and side structures are eliminated, contributing to full 360-degree visibility during digging, carrying or dumping operations, as well as assuring better balance and stability, with reduced wear on front track rollers and idlers. A long, high dumping reach is provided for dumping into trucks, hoppers, etc.

Bucket and blade attachments.






Powered by a dependable MURPHY DIESEL ME-66, 6 cyl., 6 x 6½", 150 HP continuous, 180 HP intermittent, this Universal Crusher, owned by Columbia County Highway Commission, Wyocena, Wisconsin, using ¾" mesh screen, has a rock output of 60 to 85 yards per hour.

# Powered for Big Crushing Capacity

Get a good rock crusher, powered by a MURPHY DIESEL engine, and you've got a team that can't be beat for big output at low cost. MURPHY DIESELS . . . rugged, compact, dependable . . . make good in the toughest service on heavy-duty construction equipment, simply by getting more work done at better profit. Specify MURPHY DIESEL power on new or rebuilt equipment. Write for bulletin.

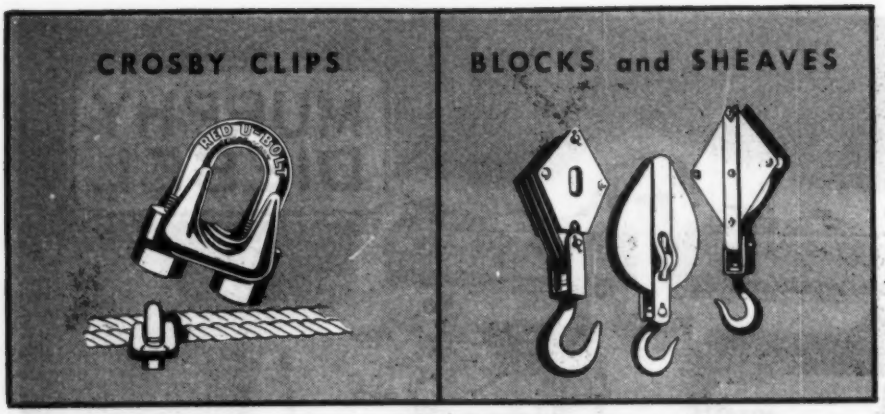
**MURPHY DIESEL COMPANY**
5307 West Burnham Street, Milwaukee 14, Wisconsin

DIESEL ENGINES: 90 HP TO 215 HP

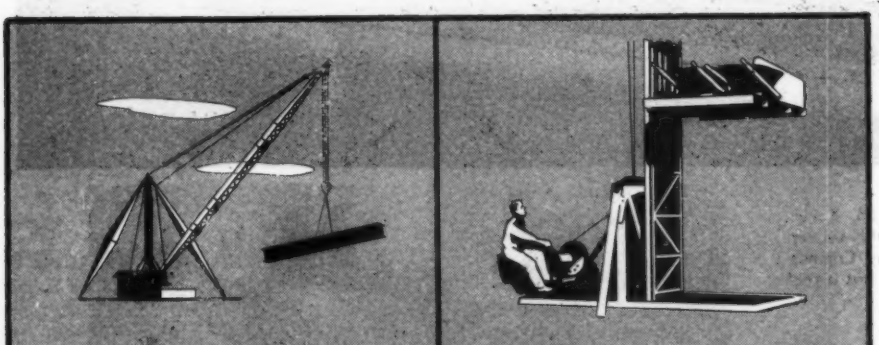
MURPHY DIESEL

GENERATOR SETS: 60 KW TO 115 KW

*Dependable Heavy-Duty Power*




In that 'phone book at your elbow, you'll find top-notch distributors who have CROSBY CLIPS, the HANDIWINCH, and AMERICAN BLOCKS AND SHEAVES on hand for immediate delivery. For fast, competent




help on any job or problem, call your AMERICAN HOIST distributor. There is a good one near you.

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St. Paul 1, Minnesota
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*Sales Offices:* New York • Pittsburgh • Chicago • New Orleans • San Francisco

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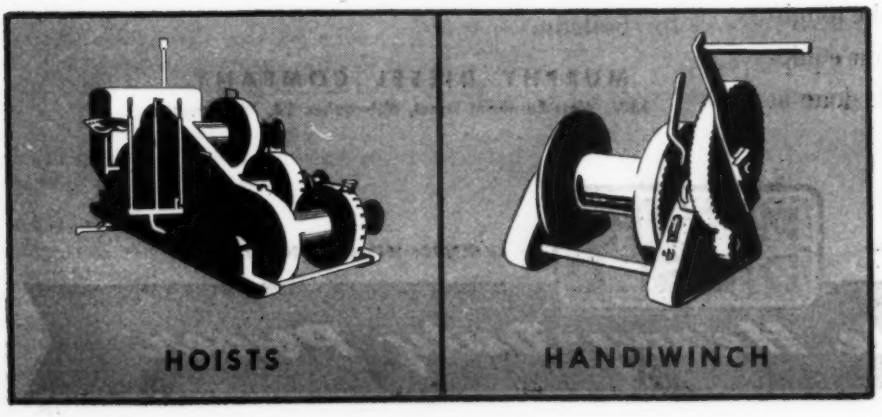




## ● Quick-Opening Sheave Blocks

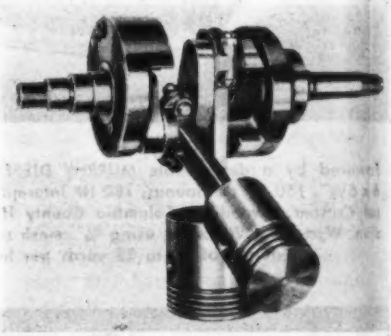
A new line of quick-opening sheave blocks for mine and construction operations has been developed by the Alloy Steel and Metals Company, Los Angeles, Calif. The blocks are constructed with manganese steel sheaves and side plates.

Alloy steel block.

All units are equipped with heavy-duty, anti-friction, sealed bearings and are of the quick-opening, "snatch block" type construction. The rope channel of the sheaves is wide and the throat of the block is wide enough to pass a square knot in wire rope.

## ● Eliminates Vibration

A new type of crankshaft which is reputed to eliminate air compressor vibration and greatly increase compressor life has been developed by the Davey Compressor Co., Kent, O. Known as the "Davey Equi-Balanced Crankshaft," the new unit spreads compressor working strokes evenly over the 360 degrees of crankshaft rotation. In 60 and 105 c.f.m. V-type compressors the new design employs a two-throw crankshaft with throws spaced at an angle which is the supplement of the V. In conventional 60-degree compressor cylinder arrangements, throws are spaced at 120 degrees.



Two-throw crankshaft.

## ● Industrial Eye Washer

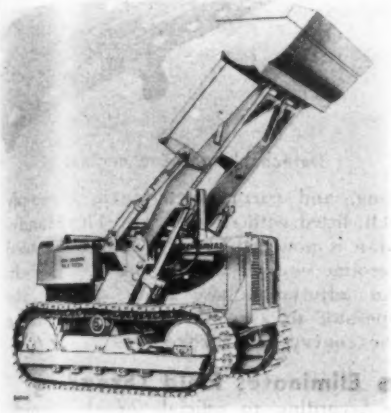
A new eye-washing fountain for the immediate flushing of eyes that have been exposed to irritating vapors, liquids, dusts, chemicals, or smoke has been invented, designed, and developed by Benson & Associates, Inc., 332 S. Michigan Ave., Chicago 4, Ill., and is now manufactured by Precision Scientific Company of Chicago, Illinois.

Double fountain.

The eye-washer is essentially a double fountain with standard inlet and drainage connections. The openings are so arranged that two streams of water are simultaneously directed against the eyes.

### • One-Cu.-Yd. Shovel

The Model TS-5 "Tracto-Shovel," to be used on the Allis-Chalmers HD-5 diesel tractor, is the first in a line of



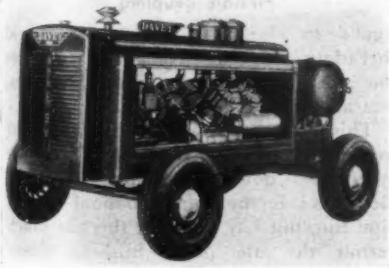
Hydraulically controlled.

tractor equipment that will be built by the Tractomotive Corporation, Findlay, O.

The unit has a hydraulically-controlled bucket operated by double-acting lift and dumping cylinders. The bucket can be dumped or closed at any height and has an automatic tilt-back to prevent spillage. Tractor-width buckets of 1-cu.-yd. capacity are standard equipment, with bulldozer blades or special buckets optional. The shovel frames are mounted directly on the tractor.

### • Portable Air Compressor

Production of a new V-type 160-cu.-ft. portable air compressor has been announced by the Davey Compressor Co., Kent, O. The compressor unit is of



V-type design.

double V-type design, with three low-pressure cylinders and one high-pressure cylinder. The unit weighs 4640 pounds and has a turning radius of 35 ft. Standard gas units are equipped with Hercules JXD engines.

### • Lightweight Conveyor

A lightweight conveyor, powered by a removable gasoline engine, is being manufactured by the McNally-Pittsburg Mfg. Corp., Pittsburg, Kansas. The "Handy-Man" conveyor will handle stone, sand, or similar loose material at a speed of 410 f.p.m., delivering from ½ to 1½ tons of material a minute, without clogging. The amount delivered depends on the size of the material and the height of lift. The conveyor is light enough to travel on the truck with the load, for use in unloading.

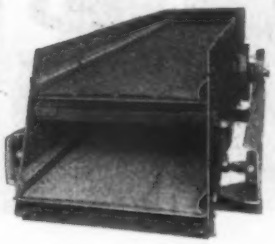
The conveyor is 13 feet, 10 inches


Stumped !

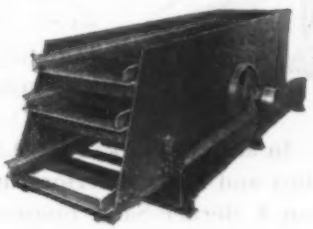
. . . with a TOUGH screening job?

Get a SECO Vibrating Screen

SINGLE DECK



DOUBLE DECK



TRIPLE DECK

Here are two good reasons why we think your particular screening problem can be solved by Seco.

**1** Every Seco vibrating screen has a true circular motion under all screening conditions. This is due to Seco's patented equalizer assembly. Bobbing and weaving are impossible . . . and even fine and sticky materials may be screened with a minimum of blinding . . . with a Seco auxiliary vibrator.

**2** Seco builds over 200 models to meet practically every type of screening requirement. Right now, thousands of Seco vibrating screens are delivering dependable, trouble-free service from coast to coast. Seco engineers invite you to put your screening problem in their expert hands. Write for "A Guide to Better Screening." Dept. A.

Patented Auxiliary Vibrator. May be attached to any Seco screen to enable efficient screening of damp, sticky materials.

TRUE CIRCULAR MOTION VIBRATING SCREENS

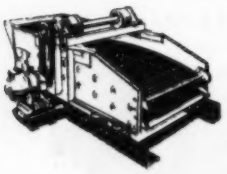
SECO

SCREEN EQUIPMENT COMPANY, INC.

9 Lafayette Avenue, Buffalo 13, New York

In Canada: United Steel Corp., Ltd., Toronto

These H&B Portable Asphalt Plants, built in 1,000 to 4,000 lb. mixer capacities, incorporate Plat-O Vibrating Screens especially designed for this type service.



Plat-O Vibrating Screens are used exclusively by Hetherington and Berner, Inc., Indianapolis manufacturers of portable and stationary asphalt mixing plants.

In asphalt work, Plat-O Screens are subjected to heat, fumes, dust and other deteriorating conditions, leading the Hetherington & Berner Sales Engineer to say: "A screen that will stand up in an asphalt plant will stand up in any kind of service."

The outstanding record of Plat-O Vibrating Screens in such rugged service *proves* the ability of Deister Machine Company Engineers to design and build screens for every type of operation. They can adapt Plat-O to *your* operation, *your* material, *your* separation problem.

Write Deister Machine Company for full information.

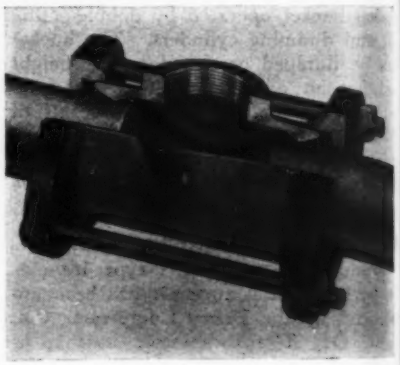
DEISTER MACHINE COMPANY
FORT WAYNE 4, INDIANA

Detachable gasoline engine.

long, and carries a ten-inch, three-ply belt, fitted with steel cleats. The Handy-Man is powered by a 1½-hp. air-cooled gasoline engine, and a type "A" V-belt. An adjustable base plate enables the operator to keep the motor level when the conveyor is inclined.

## ● Eliminates Field Threading

According to officials of the Smith-Blair Company, South San Francisco, Calif., manufacturers of a flexible tee coupling, this product offers a greatly simplified way of connecting laterals to existing pipelines. The coupling is de-



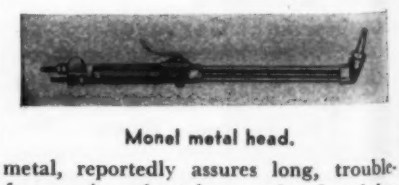
Flexible coupling.

signed to eliminate the need for field threading in the trench and obviates the use of flexible couplings, nipples, tees and unions.

This device is available for 2-in. cast iron, standard and o.d. pipe and for other sizes down to ¾-inch. In each the outlet is the same nominal size as pipe run, but has standard threads which permit the use of a bushing where needed.

## ● Cutting Torch

The Air Reduction Sales Co., 60 E. 42nd St., New York City, reports that its Series 9000 cutting torch, discontinued during the war years is back on the market. The torch head, made of monel



Monel metal head.

metal, reportedly assures long, trouble-free service; the tubes, made of stainless steel, offer great rigidity and heat resistance. All connections are silver brazed for permanent leak-proof service.

The standard torch is 21 inches long and weighs 3 pounds 4 ounces; it is usually supplied with 75-degree or a 90-degree head.

### • 3000 Watt Electric Plant

D. W. Onan & Sons Inc., 43 Royalston Avenue, Minneapolis, Minn., have introduced a new mobile floodlighter recommended for night jobs.

The floodlighter assembly consists of an Onan 3000-watt a.-c. electric plant,

Mobile Floodlighter.

plus four floodlights. These 750-watt floodlights are mounted on steel standards that may be raised to a height of 7 feet and which swing 360 degrees horizontally. Each floodlight has a toggle switch.

The generating unit provides a d.-c. output for recharging the two heavy-duty starting batteries. Four receptacles are available for operating auxiliary lights or electric tools.

### • Temperature Indicator

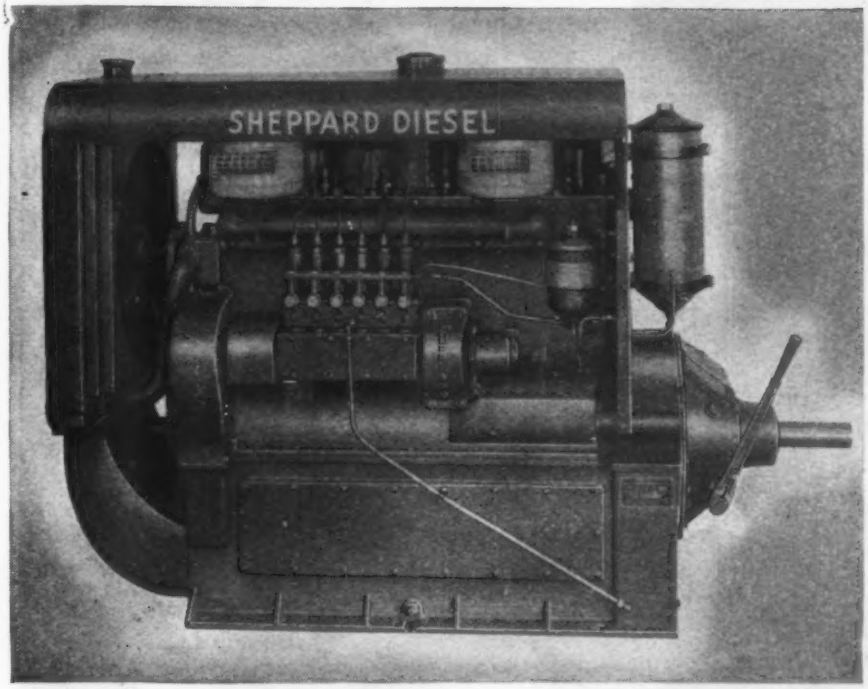
A high-speed temperature indicator for multiple thermocouple readings has been developed by Leeds & Northrup Company, 4934 Stenton Ave., Philadelphia

Reads 100 thermocouples.

44, Pa. The "Speedomax Indicator" reportedly can handle more than 100 thermocouples, even at low temperatures and short ranges. It is claimed that the instrument can log temperatures as fast as the operator can write down his readings.

Drilling, blasting, crushing, screening, and electrification are only a few of the many subjects completely covered in the 23 chapters in the Pit and Quarry Handbook.


MORE *Actual* POWER




MEANS *Less* POWER COSTS

*This 6 cylinder Sheppard Diesel . . . rated at 56 continuous H.P. at 1200 R.P.M. or 62 continuous H.P. at 1400 R.P.M. . . . will do the work of most 100 H.P. engines at a fuel cost of approximately 31c* per hour when operating under full load.*

**Why?**

Because Sheppard Diesels are rated by their actual *continuous* power output when operating with *all accessories.* This is in sharp contrast with most engine ratings which are based on the *calculated* performance of a *bare* engine.

Delivered complete with electric push-button starting, Sheppard Diesels are simple to operate, easy to service. Their *full diesel* operation reduces power costs still further by eliminating the maintenance of an electrical ignition system and a carburetor.

Write today for literature and specifications on the model 12 Sheppard . . . the Diesel that delivers *all* the power you buy!

**R. H. SHEPPARD CO., INC., 13 Middle St., Hanover, Pa.**

**Generating Sets, 2,000 to 36,000 watts • Power Units, 3½ to 62 continuous H.P.**

Sheppard DIESEL — DIESEL'S THE POWER . . . Sheppard's the Diesel

*Using 8½c gal. fuel oil.

**YOU'RE SAFE**
**With *NAYLOR***
**in**
**Mining Service**

The safety factors built into Naylor light-weight pipe have made it outstanding in the mining field. The exclusive Lockseam Spiralweld provides the reason. Acting as a continuous expansion joint, this structure absorbs shock loads, vibration, expansion and contraction . . . insuring closer conformity to topographical conditions without any sacrifice of strength. For high pressure hydraulic lines, high and low pressure air lines, de-watering and drainage lines, ventilating lines, water supply lines and sludge lines, it will pay you to specify Naylor light-weight pipe.

*Write for Naylor Catalog No. 44*

Naylor

**NAYLOR PIPE COMPANY**
1257 East 92nd Street • Chicago 19, Illinois
*New York Office:* 350 Madison Avenue • New York 17, N. Y.

## ● Fire Fighting Unit

Fire protection in the form of a complete high-pressure portable pumping and fire-fighting unit is offered in the "Porto-Pumper," a development of Port-Pump, Inc., 227 Iron Street, Detroit 7, Mich. Mounted on a two-wheeled trailer, the

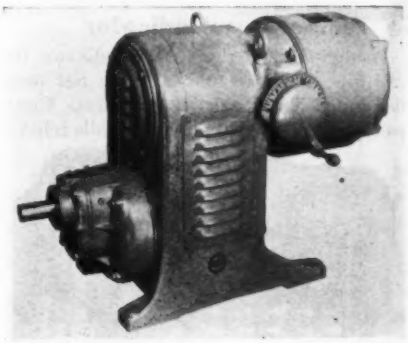
Trailer-mounted fire pump.

Porto-Pumper consists basically of the Porto-Pump, a gasoline-driven high-pressure utility pump; 75 feet of 2-in. supply hose and 250 feet of 1½-in. fire hose; an 18-ft., three-section extension ladder; a fire axe and a hand-type extinguisher.

The unit is capable of delivering 40 gallons of water per minute at 120 pounds pressure.

## ● Built-in Speed Reducers

A new series of "Varidrive" motors variable speed drives, designated as Size 23, has been announced by U. S. Electrical Motors, Inc., Milford, Conn. A



Variable speed drives.

wide variety of assemblies is available to fit almost any application, such as horizontal frame with shaft on the left or right, upright frame with shaft high or low, and built-in speed reducers of single or double reduction. Speed variations of 2:1 to 7:1 are obtainable with a 5-hp. output.

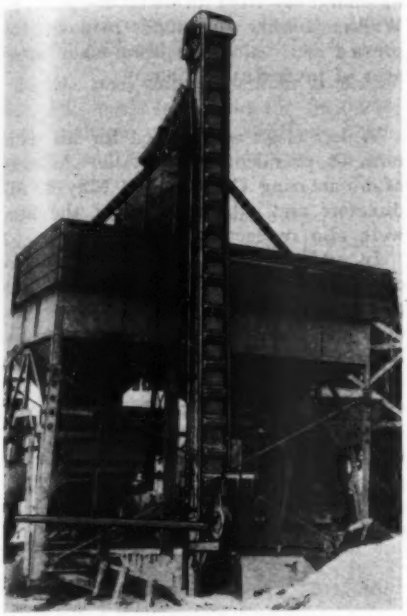
## ● Steel Electrodes

A complete line of stainless steel electrodes in a full range of grades and diameters has been announced by Air Reduction Sales Company, 60 East 42nd Street, New York 17, N. Y.

All Airco stainless steel electrodes are furnished with a heavy extruded lime-type coating for d.-c. application. In addition all but the straight chrome analyses are obtainable with a lime-titania-type coating which is usable on a.c. or d.c. The slag produced by either of these coatings is easily removed.

## • Bucket Loader

The addition of a new type of loading equipment to their line has been announced by the Baughman Manufacturing Co. of Jerseyville, Ill. The loader, a vertical belt-bucket type, has been designed for sites where vertical loading is required with limited space for the installation. Heights from 10 to 75 feet are available and elevating speeds up to approximately 60 tons per hour.



60 tons per hour.

A new type of work glove has been produced by Riegel Textile Corporation, New York, N. Y. The "Super Canton" is soft and flexible and has a non-slip surface that is said to facilitate gripping and increase protection.

## • New Line of Trucks

Improvements and advancements for the comfort and convenience of the driver are featured in the new line of Chevrolet trucks and commercial cars shown to the public for the first time on June 28. Features of the 6100 series are a heavy-duty chassis and a gross vehicle weight of 16,000 pounds, with a payload capacity of five tons. The unisteel cab is all-welded and will seat three men comfortably.


ALL IN A DAY'S WORK

8 A.M.

• LOADING FROM STOCKPILE AT 8 A. M.

10 A.M.

• DITCHING 30 MILES AWAY AT 10 A. M.

The SCHIELD BANTAM travels on the highway at normal speeds. Drives right up to the job and starts to work without wasting time. Use it as a dipper, trench hoe or dragline. The BANTAM handles stockpile material at a rapid pace, digs ditches in varying widths up to 10′ deep, and works wherever larger heavy weight equipment is not profitable. Simple, centralized controls. Full-circle design. Perfectly balanced for easy handling. Interchangeable booms. Wide selection of attachments for fast operations. Complete unit weighs 4 tons. Mounts on 6 x 6 truck or half-tracks.

***WRITE FOR COMPLETE DETAILS***

**SCHIELD BANTAM CO. INC.**
**Waverly, Iowa**

BANTAM

SCHIELD BANTAM 1/4-YARD PORTABLE SHOVEL-TRENCH HOE-CLAM-DRAGLINE

# TRADE NOTES

W. A. Olen

Walter A. Olen, president of The Four Wheel Drive Auto Company, Clintonville, Wis., has been named Wisconsin vice-president of the National St. Lawrence Association. He replaces the late Leathem D. Smith, who lost his life last summer on Green Bay.

Mr. Olen favors the completion of the St. Lawrence Waterways facilities in order to expedite the shipment of Midwest manufactured items and agricultural produce directly from the Great Lakes ports to seaboard cities and foreign countries.

Eric C. Gyllensvard, export and New York office manager for Farrel-Birmingham Company, Inc., was killed on February 17, when he was struck by lightning while in Sao Paulo, Brazil. Mr. Gyllensvard was at the time on a business trip for Farrel-Birmingham. He had been associated with the company since 1944, having been previously connected with the Standard Oil Company and the Sullivan Machine Company. In 1942 he was elected president of the Machinery & Metals Export Association.

The recent transfer to the Detroit sales staff of V. F. Radcliffe, New York sales representative of the Chase Bag Company, has been announced by R. N. Conners, vice-president and general sales manager.

R. S. Wilson

Robert S. Wilson, vice-president and sales manager of The Goodyear Tire & Rubber Co., Akron, O., was recently selected to receive the Charles Coolidge Parlin Memorial Award for outstanding contribution to broader perspective to marketing and market research practice. The memorial is sponsored by the Philadelphia chapter of the American Marketing Association and the Curtis Publishing Company.

Mr. Wilson's experience covers an uninterrupted period of 34 years with the Goodyear company.

The Commercial Shearing & Stamping Co. of Youngstown, O., has announced two promotions. Howard S. Thompson, who was formerly manager of pressed steel sales, is now assistant vice-president in charge of sales promotion. John E. Wallis, former assistant manager of pressed steel sales, has been made manager of pressed steel sales.

Walter Geist was elected for his sixth term as president of the Allis-Chalmers Manufacturing Company on May 8. All directors and other officers of the firm were also re-elected.

In addition to Mr. Geist, the officers elected are J. A. Keogh, vice-president and comptroller; H. W. Story, vice-president and general attorney; W. E. Hawkinson, secretary and treasurer; E. H. Brown, vice-president in charge of engineering development; W. C. Johnson, vice-president in charge of the general machinery division; W. A. Roberts, vice-president in charge of the tractor division; and James M. White, vice-president in charge of manufacturing.

Budd E. Simonton has been appointed manager of the Oswego (N. Y.) Multiwall Paper Bag Plant of the St. Regis Paper Company, according to an announcement by Willard E. Hahn, general manager of bag production.

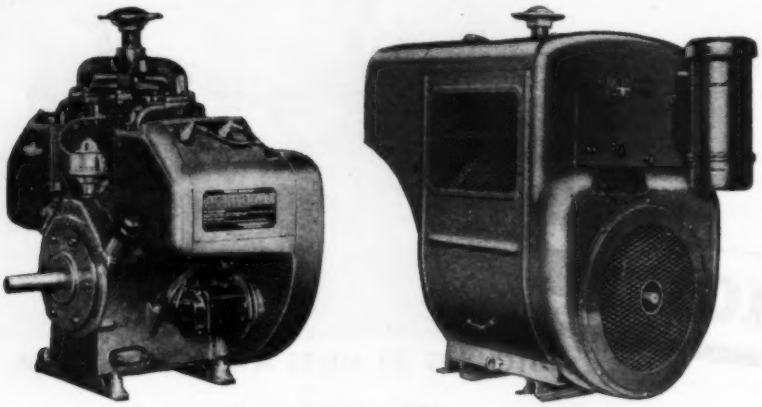
The following appointments have been announced by the Laclede-Christy Clay Products Company:

Paul J. Maddox, assistant vice-president, has been made general sales manager of the firm's Refractories Division. N. C. Michels, formerly of the Carnegie Illinois Steel Corp., is now chief engineer of the company. John B. Ives has been appointed manager of operations, in complete charge of the manufacturing and mining operations of St. Louis and Toledo plants and mines.

The Four Wheel Drive Auto Company announces the establishment of sales headquarters in the Masonic Building, Duncan, Okla., for its Southwestern sales region. This territory includes the states of Oklahoma, Texas, New Mexico, Arkansas, Louisiana and Mississippi. Wm. C. Merrill was appointed sales manager of this territory.

Karl Kersten, 64, Chicago manager for the Cincinnati Rubber Manufacturing Company, was fatally injured on May 22 when a gust of wind caught the door of his garage, swung it against him and knocked him to the pavement. Mr. Kersten died of a skull fracture a short time after he had been taken to a hospital.

The Truckstell Co., national distributors of special truck equipment, today announced the appointment of W. F. Balzerick as merchandising manager. During the last two years he has served as Western divisional manager.

*Let this 20-Horse Team*

**Handle Your Heavy-Duty Power Jobs**

Turning up 20.5 hp. at 2200 R.P.M. the Model VE-4 WISCONSIN Standard Air-Cooled Engine (left) and the Model VE-4 Complete Power Unit (right), can always be depended upon for continuous, heavy-duty operation in any kind of service, on any kind of equipment within their power range.

Positive, trouble-free AIR-COOLING; dynamically balanced crankshaft mounted on tapered roller bearings, *front* and *rear*; extra-long connecting rods; light weight pistons . . . these are features that you can bank on for top performance.

***Specify Wisconsin Air-Cooled Engines for YOUR equipment . . . for most hp.-hours of service, at the lowest overall cost.***

**WISCONSIN MOTOR Corporation**
MILWAUKEE 14, WISCONSIN
*World's Largest Builders of Heavy Duty Air-Cooled Engines*

Government-owned facilities in the plant of the Commercial Shearing and Stamping Company, Youngstown, O., are being acquired by that company for $182,300 cash, the War Assets Administration has announced. The facilities cost $380,703 when installed.

Surplus steel casting facilities at Birdsboro, Pa., have been sold for $450,000 to the wartime operator, Birdsboro Steel Foundry and Machine Company, as announced by WAA.

The sale includes all the property and rights embraced in U. S. Navy Contract, NOBs 105 on an "as is, where is" basis. The facilities were built to expand company steel casting production during World War II.

C. A. Barabe, assistant Eastern Division sales manager of Caterpillar Tractor Co. since June, 1945, has been granted a six-month medical leave of absence.

W. N. Foster

C. A. Barabe

W. N. Foster, divisional district representative, has been promoted to the assistant managership.

Mr. Barabe, a member of the "Caterpillar" organization since 1937, served in the U. S. Army during World War II in the North African, Sicilian and Italian campaigns.

Mr. Foster, whose promotion is effective immediately, became a district representative in 1944.

The Acme Rubber Manufacturing Company, Trenton, N. J., has recently announced the promotion of L. J. Amsdell to the position of Eastern sales manager. He will make his headquarters in the Woolworth Building, 233 Broadway, New York City.

Euclid-Chicago Company, 201 North Wells Street, Chicago 6, has been appointed Euclid distributor for northwestern Indiana, northern Illinois and southern Wisconsin. Principals of the company, which will handle Euclid equipment exclusively, are Robert M. Jones and Horace K. Church. The service and parts department is in charge of Harvey Landmeier; Jack Wathen is office manager.

At a meeting of the board of directors of Bemis Bro. Bag Co., St. Louis, Mo., R. D. McAusland was elected a vice-president of the company.

Mr. McAusland, who started his career with Bemis in 1900 became a director of the organization in 1936 and was appointed Pacific Coast general manager in 1941.

M. J. Davis, president of the Hammond Bag and Paper Company, Wellsburg, W. Va., announced upon the occasion of the firm's 25th anniversary that plans are under way for considerable expansion of its facilities.

M. J. Davis

Hammond makes a variety of single- and multi-wall bags for shipping fertilizer, cement, rock products and other items. Mr. Davis has served the firm continuously since its founding.

The American Brake Shoe Company announces the opening of a new sales office at 1500 Walnut Street in Philadelphia, Pa., which will be occupied jointly by representatives of four divisions of the company. James J. Nelson will represent the National Bearing Division; Thomas N. Mitchell, district manager, the Kellogg Division; L. John Harwood, the Electro-Alloys Division; and George E. Anne, the Brake Shoe & Castings Division.

Robert S. Bailey, district engineer for the Western Machinery Company of San Francisco at Harrisburg, Ill., has announced plans for opening an office for the firm in Chicago.

EXPECT BIG THINGS

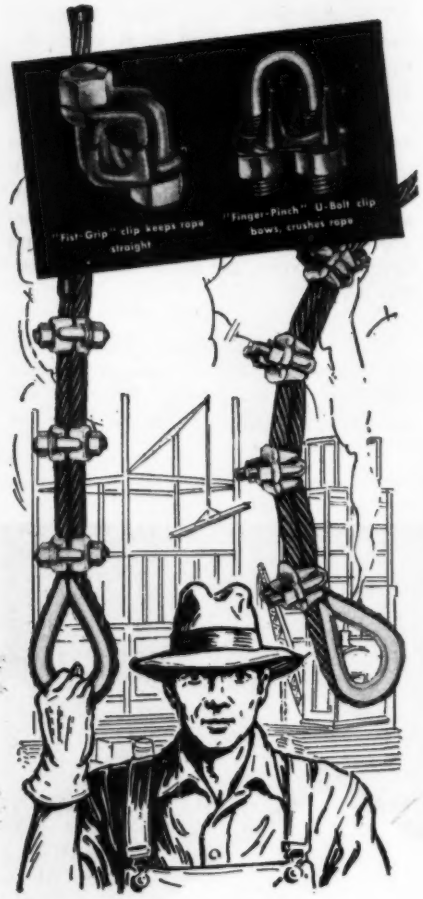
from the belt that carries this name

Yes, *expect big things* in production and operating economy... TRANSMISSION BELTS that deliver maximum horsepower and give long trouble-free operation... CONVEYOR BELTS that carry big tonnage at a low belt cost per ton and give long unfailing service.

*Buy "CINCINNATI"* for the best in belting today.

THE CINCINNATI RUBBER MFG. CO.
CINCINNATI 12, OHIO

CINCINNATI CONVEYOR BELTS




**"I'LL TAKE MINE STRAIGHT"**

A *straight* rope is a *stronger* rope . . . and for maximum strength, rope makers *insist* that kinking and crushing be eliminated. U-bolt clips *always* deform rope . . . particularly if they're "staggered". But LAUGHLIN "FIST-GRIP" CLIPS *insure* a straight rope because four flat bearing surfaces deliver uniform pressure over entire contact area . . . rope *stays* straight — no reverse bends under load.

"FIST-GRIPS" are foolproof . . . made in identical halves — can't be "staggered" . . . nuts on opposite sides for quick, easy wrenching . . . bolts and saddles drop-forged for strength and SAFETY. Look for LAUGHLIN'S "L" trade-mark at your supply house . . . write for catalog to Dept. 3, The Thomas Laughlin Co., Portland 6, Maine.

**LAUGHLIN**

THE MOST COMPLETE LINE OF DROP-FORGED WIRE ROPE AND CHAIN FITTINGS

Robert P. Nichols has been appointed assistant domestic sales manager for R. G. LeTourneau, Inc., Peoria, Ill.

R. P. Nichols

Coming to LeTourneau after serving overseas as a maintenance officer in the navy, Mr. Nichols became a field engineer in the installation department, and more recently moved to the Export Division as sales supervisor.

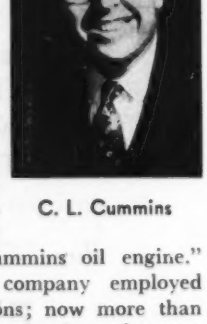
J. S. Sawyer

Joshua S. Sawyer, manager of the asphalt department of the Shell Oil Company of New York, N. Y., and a director and vice - president of the Asphalt Institute, died on April 6 after a three-month illness.

Mr. Sawyer was a member of the American Society of Civil Engineers and the American Society of Military Engineers.

In line with the national trend, the Allis-Chalmers Mfg. Co. on May 1 placed in effect a wage increase of 11½ cents an hour and six paid holidays for all hourly wage employees not covered by collective bargaining agencies at the West Allis Works, it was announced by Walter Geist, president.

Mr. Geist said that adjustments were also made for non-represented salaried employees and that simultaneously in all the company's plants a similar offer was made to A.F.L., C.I.O., and independent unions holding collective bargaining contracts with the company.



C. L. Cummins

C. L. Cummins, founder of the Cummins Engine Company, Inc., Columbus, Ind., in 1919, was recently elected chairman of the board of directors. At the same time J. I. Miller was named president.

The firm headed by these two executives was founded to build what in 1919 was called the "Cummins oil engine." In that year the company employed fewer than 20 persons; now more than 2,000 workers are on the Cummins payroll.

Eugene C. Bauer Jr. has been elected a vice-president of the Kensington Steel Company of Chicago, manufacturers of manganese steel castings.

Directors of Elastic Stop Nut Corporation of America today elected John R. Munn, previously president of the company, chairman of the board of directors and William F. McGuinness, previously vice-president and treasurer, as president. Mr. Munn succeeded as chairman John F. Casey Sr., who retired after having been connected with the industry from its inception.

In keeping with the policy of The Euclid Road Machinery Co. to expand its services to distributors and customers, a sales development department, headed by V. L. Snow, has been established.

Mr. Snow joined the engineering department of Euclid in 1935 and served as assistant chief engineer until 1942. At that time he became manager of industrial products, a position he has held until his recent promotion.

The St. Regis Sales Corporation (New York) has announced the opening of a multiwall paper bag sales office in Louisville, Ky., under the supervision of Charles C. Keefer. The address is 318 Martin Brown Building.

Dave S. Ferree was recently appointed district manager of the new Philadelphia sales office of The Falk Corporation. His territory includes the Pennsylvania and Delaware areas formerly handled by Martell and Ferree and the York and Pennsylvania area, which was managed by the late John Ericson. The Philadelphia offices of the Milwaukee plant are located at 505 Race St.

In charge of the six major divisions of the newly-organized management control of the A. F. Green Fire Brick Company, Mexico, Mo., are the following:

H. B. Plunkett, director of sales, domestic and foreign; A. D. Bond, director of affiliate and subsidiary companies, domestic and foreign; L. J. Miller, director of manufacturing; N. S. Wood, director of procurement and properties; D. H. Dreutzer, director of finance; W. G. Staley, director of industrial relations. All are vice-presidents and members of the firm's board of directors.

The Truckstell Manufacturing Co., a national distributing organization for special automotive equipment, observed its tenth anniversary with a one-week convention at the Edgewater Beach Hotel in Chicago, April 21-26.

The appointment of W. T. McCurdy as district manager for Tennessee and Arkansas is announced by Mack Trucks, Inc. In his new capacity Mr. McCurdy will supervise all of Mack's activities in these two states, including a dealer organization composed of 21 outlets.

Robert P. Tyler has been elected vice-president in charge of sales for the Macwhyte Company of Kenosha, Wis. Mr. Tyler was formerly general sales manager.

R. G. LeTourneau, Inc., Peoria, Ill., has announced several personnel changes in its domestic sales division.

O. A. Williams has been appointed Western sales manager, with headquarters at the Stockton, Calif., office.

E. M. Ferguson has been appointed Eastern sales manager. His office is at

O. A. Williams

E. M. Ferguson

1026 17th St., N. W., 412-413 Defense Building, Washington, D. C.

C. D. Frey, formerly industrial sales representative for the Western United States, now serves in that capacity for the entire country. His headquarters is at the company's Peoria, Ill., plant.

The company's central sales office has been moved from Peoria, Ill., to the Central Bank Bldg., Kansas City, Mo. W. B. Worden supervises sales and service activities from this office.

Sales and earnings of the St. Regis Paper Company (New York) and subsidiaries for the first quarter this year set new records for the period, reflecting in large part the results of the company's long-range development and expansion program, as announced by Roy K. Ferguson, president.

"The extensive development and expansion program started about two years ago, and which involved the company's pulp, paper, bag and plastic production and converting facilities, is nearing completion," Mr. Ferguson stated.

"The company's major acquisitions during this period included the purchase from Time, Inc., of the Hennepin Paper Co., of Little Falls, Minn.; Bryant Paper Co., Kalamazoo, Mich.; and Maine Seaboard Paper Co., Bucksport, Me.

"In addition, St. Regis acquired southern properties for the first time through the purchase of the Florida Pulp and Paper Company, Pensacola.

"The new 75,000-ton multiwall kraft mill and bag factory now under construction at Pensacola by Alabama Pulp and Paper Company in which St. Regis has an interest, is proceeding according to schedule. . ."

Arthur B. Summers of White Plains, N. Y., has joined the sales force of the Kotal Company, 360 Springfield Ave., Summit, N. J. Mr. Summers was associated with Patterson & Rossi, contractors, for eight years.

W. C. Johnson, vice-president of the Allis-Chalmers Mfg. Co., was one of the speakers at a luncheon meeting of the Midwest Power Conference on April 1 at the Palmer House in Chicago.

The election of William H. Versfelt and Edward G. Murray as vice-presidents of the St. Regis Paper Company (New York) has been announced by Roy K. Ferguson, president.

Gerlinger Carrier Company will be the official firm name of the Dallas Machine & Locomotive Works, as of April 21, 1947, according to V. O. Williams, general manager of the company. It was stated that the new name—Gerlinger Carrier Company—will more closely conform with the products manufactured.

William A. Anderson and W. B. Lyon, retired employees of the Hercules Powder Co., between them have had more than a century of experience in the explosives industry. Mr. Anderson, who retired May 1, had been in the industry for 49 years. He first served Hercules as resident manager of the explosives department at Buffalo; later he was transferred to New York.

Mr. Lyon, branch manager of Pittsburgh from 1913 until he retired in 1936, had 51 years of service at that time.

Manhattan Rubber Division of Raybestos-Manhattan, Inc., Passaic, New Jersey, has announced that the Asbestos Company of California, 941 16th Street, San Francisco, will represent them in the San Francisco area. Customers will have the advantage of being served by the new Raybestos-Manhattan warehouse at 131 Mission Street.

Harold VonThaden, vice-president of the Robins Conveyors Division and a director of the parent company, Hewitt-Robins Incorporated, sailed on April 9 on a business trip abroad. He will first visit the British General Electric Co., parent organization of the Frasier & Chalmers Engineering Wks., British Manufacturers for Robins Conveyors. Then he will continue on to the Continent to transact other business and engineering matters for the company in relation to coal mining.

Arthur D. Brown, formerly manager of the Los Angeles Allis-Chalmers district office, has been named manager of the company's Washington, D. C., office. R. N. Landreth, acting manager of the Washington, D. C., office, will now devote full time to his special duties as assistant to W. C. Johnson, vice-president of Allis-Chalmers general machinery division.

A. D. Robertson, formerly assistant manager of sales and engineering of the electrical section at the Norwood, O., works, has been named manager of the company's Tampa, Fla., district office, succeeding the late Berrien Moore.

Neil C. Hurley Jr., president of the Independent Pneumatic Tool Company of Chicago recently addressed members of the National Industrial Advertisers Association at a meeting in Chicago. His topic was "The Numbers Game in Sales Promotion."


Investigate

this MODERN Core-Drilling Machine

*It's Engineered to Meet Your Most Severe Demands*

Sprague & Henwood Core Drilling Machines are modern in every respect . . . can EASILY perform the work expected of them! That's because they are built to meet the demands of present day core drilling work! The machines are high speed, of exceptionally sturdy construction to withstand rugged service. Available with two distinct types of feeds, "Screwfeed" and "Hydraulic," according to the type of swivel head selected. Have many exclusive features. Write today for full details.

ALSO DRILLING CONTRACTORS

Bortz DIAMOND BITS are also manufactured by Sprague & Henwood. Full details sent upon request.

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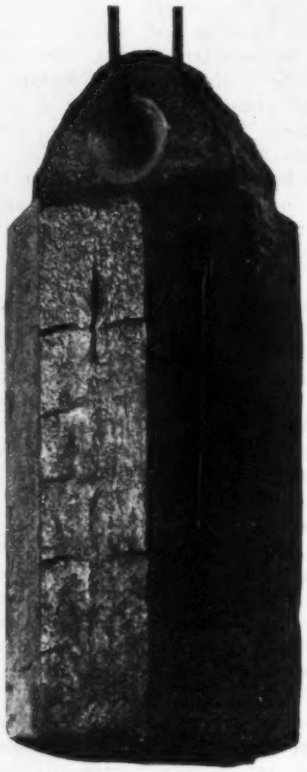

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# Legal Decisions


**By LEO T. PARKER**

Attorney at Law


## What You Want to Know

During the past few months many readers have submitted legal questions relating to nonmetallic products. Therefore, we shall briefly review interesting and informative higher court decisions in line with these inquiries in order to prepare readers to avoid similar law suits. Readers who desire complete data on any briefly explained decision may identify it by reference to the citation and obtain and read the decision in any good library.

Recently a reader wrote: "We have been taking sand and gravel from another person's land for several years. Since, now, we learn that our survey was wrong, can we claim this land under the 'adverse possession' law?"

## Not Adverse Possession

According to a recent higher court any one who occupies real property owned by another finally, after 18 years possession, is true and legal owner of the property. However, the possession must be adverse or against the will of the true owner otherwise the occupant of the premises acquires *no* title.

For illustration, in *Drill Sand and Gravel Company,* 177 Pac. (2d) 642, reported May, 1947, it was shown that a sand and gravel company used land over 20 years without paying any rentals.

Finally the company officials contended that it owned the land because it had occupied it for so many years. The higher court refused to agree with this contention because the land owner did not know during these years that the company was using his land.

## Lease Renewal

Modern higher courts consistently hold that a lease is automatically renewed if the original lease contract contains a clause which can be construed to mean that the parties *intended* to *extend* the term of the original lease.

For illustration, in *Bussen v. Del Commune,* 199 S. W. (2d) 13, reported April, 1947, it was shown that by the terms of a lease one Baum was given the sole and exclusive right for 25 years of operating a quarry upon the land. He was obligated to pay the land owner certain monthly royalties upon the stone removed from the premises.

The lease contract contained this clause: "The said parties of the first part (land owner) agree to lease these premises to the said party of the second part at the expiration of this lease for a like number of years at the same rates and provisions as in this lease expressed."

At the termination of the original lease, the land owner refused to renew the lease for another 25 years. The higher court ordered him to renew the lease, saying:

"The agreement 'to lease' evidently contemplated the execution of a new lease. But even though the Burgerts (land owner) refused to execute the lease, we cannot believe that their refusal affected the Del Communes' (quarry operator) right to retain possession of the premises for the additional term of 25 years."

## Center Is Right

Considerable discussion has arisen from time to time over the questions with respect to the legal boundary line between owners of lands bordering on a stream.

In *Gill v. Hedgecock,* 184 S. W. (2d) 262, it was shown that a deed held by a sand and gravel company described its land as lying "north of the river."

In the ensuing litigation the higher court held that it actually owned to the center of the stream.

## $10,000 Damages

Generally speaking, a higher court will approve a verdict involving excavation damages rendered by a jury for "reasonable" damages.

For illustration, in *Clifford v. State,* 148 Pac. (2d) 302, it was shown that a property owner sued a company to recover twenty-five thousand dollars damages alleged to have been caused by casting of sand and gravel upon his property.

The counsel for the company admitted encroachment upon the other's property but denied damage in the amount of twenty-five thousand dollars. The jury *inspected* the property and also heard the testimony of three *experienced realtors* and appraisers who testified that the depreciation in value resulting from the encroachment upon the property was ten thousand dollars.

The jury allowed the property owner ten thousand dollars, instead of the desired twenty-five thousand dollars. The higher court upheld the verdict.

## Breaches Contract

When construing a contract, the courts always resort to the *conduct* of the contracting parties rather than the exact written words in the contract.

In *Acme,* 39 Atl. (2d) 422, it was shown that a rock company made a written contract to deliver "500 to 600 tons" of rock each day *to* December 2. There was no provision as to the quantity of rock the company agreed to furnish after December 2. The company furnished 500 to 600 tons a day before December 2, but discontinued deliveries thereafter.

The purchasing company sued the rock company for damages and proved that verbal agreements and "conduct" of the rock company indicated that it would supply 500 to 600 tons of rock a day after December 2.

The higher court held the rock company liable for $32,728 damages, and explained that although the written contract specified that the rock company need only supply 500 to 600 tons of rock a day to December 2, yet the conduct and verbal agreements indicated conclusively that the rock company *intended* to supply this same quantity of

crushed rock each day until the purchasing company's contract was completed.

### Must Comply with Contract

Generally speaking, both parties to a contract may file a suit and compel the other to comply with the terms of the contract.

For illustration, in *Silver Hill Sand & Gravel Company v. Carozza Corporation,* 40 Atl. (2d) 311, it was shown that a sand and gravel company agreed to pay a property owner 6 cents per ton for all sand and gravel mined, delivered or sold from any of the properties.

The company refused to render the monthly statements to the property owner, who sued and asked the court to compel the company to furnish the agreed monthly statements.

The higher court held in favor of the land owner.

### No Negligence

Modern higher courts consistently hold that no injured employee may recover damages from an employer unless he proves negligence on the part of the employer.

For instance, in *Crain v. State,* 29 So. (2d) 406, it was shown that an employee sued his employer for damages. He sustained severe injuries while in the course and scope of his employment when struck with the shovel by another employee named Ben while loading gravel. The higher court refused to hold the employer liable, and said:

"With reference to the negligence of Ben, there is no showing whatsoever that he was a careless employee."

### Reasonable Contract

Modern higher courts consistently hold that one injured by the breach of a contract is entitled to a just and adequate compensation for such injury, but no more.

In *Avery v. Fredericksen and Westbrook,* 154 Pac. (2d) 41, it was shown that a land owner made a contract with a sand and gravel company which clearly specified that before removing sand the company would strip one foot of top soil from the property and *after* the sand was removed it would "level off" the property from which material was removed.

The company removed 100,000 cu. yds. of sand from a three and one-half acre area but did *not* level off this area nor replace the top soil.

The property owner sued the company for $10,400, alleged to be the reasonable cost of leveling off the three and one-half acres and replacing the top soil.

The court agreed that it would cost approximately $10,000 to level off the three and one-half acres and replace the top soil, but since the actual value of the three and one-half acres was only $87.50, if sold on the market, the court allowed the property owner only $87.50 damages.

### Guard Explosives

Modern courts consistently hold that all employers who use inherently dangerous instrumentalities, as dynamite, must exercise a *very high* degree of care to prevent injury to others. But no employer is liable for injuries caused by employees who act *outside* the scope of their employment.

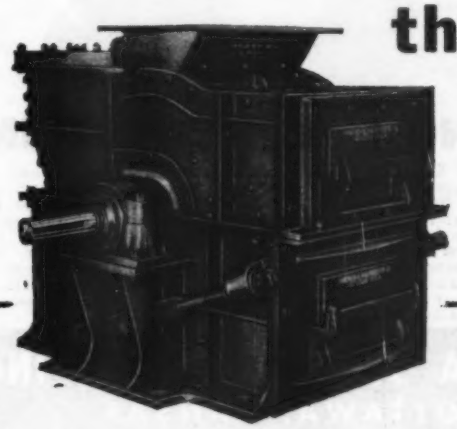
For illustration, in *Loyd v. Herrington,* 178 S. W. (2d) 694, a sand and gravel company was sued by an automobile mechanic. The testimony proved that the employer was careless and let unexploded dynamite caps lie around. One day an employee found a cap and decided to play a prank on a motor truck driver; he wired the cap on the motor of the truck in such a way that it would explode and frighten the driver when the motor starter was pressed. But the mechanic raised the hood to inspect the motor and the cap exploded, putting out his eye. The mechanic sued the employer for damages.

The higher court held the employer not liable because the employee who caused the injury did so while acting *outside* the scope of his regular employment.

### Ambiguous Lease

If a lease contract is ambiguous and has inconsistent clauses the court will decide the suit on the basis of *what the parties intended* when the contract was signed.

For example, in *Harjo Gravel Company v. Luke-Dick Company,* 153 Pac. (2d) 112, it was shown that a property owner and a gravel company made a lease contract. This contract specified that for $400 the property owner "conveyed" all of the gravel deposits. But another clause in the contract stated that

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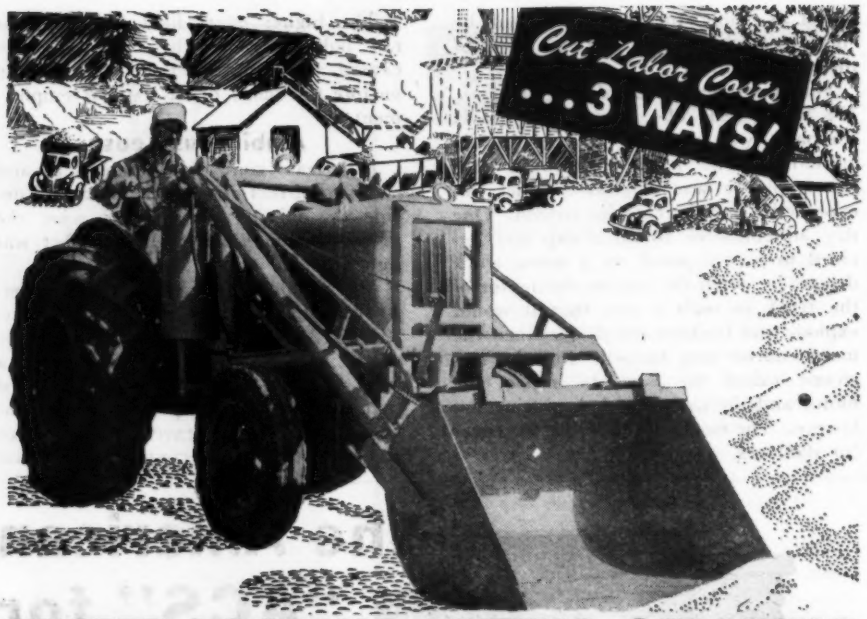


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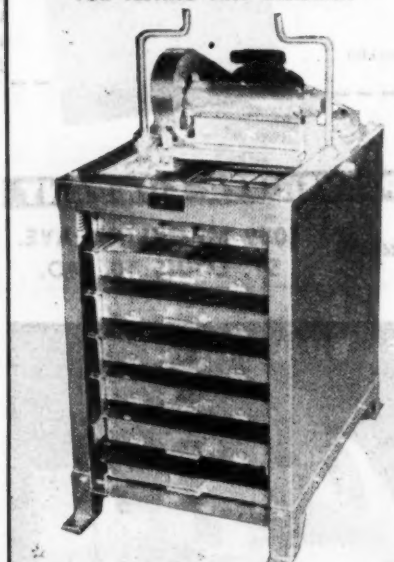

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the gravel company had the right to "enter upon land for the purpose of removing said gravel for a period of five years."

Litigation arose over the correct interpretation of the contract. The property owner contended that at the termination of five years the gravel company must vacate the premises. The gravel company contended that for $400 it had purchased all the gravel on the land, and that it did not have to vacate the premises at the end of five years.

The higher court held that the contract gave the gravel company *only* a lease to take gravel from the premises for five years.

## Rock Company Wins Suit

Generally speaking, if the owner of property defaults in making agreed payments to the holder of a mortgage the latter may foreclose the mortgage. However, a late higher court held that if the default relates to *small* items, the usual law is different.

For illustration, in *Gilbert v. Pennington Rock Company*, 39 Atl. (2d) 647, it was shown that the Pennington Rock Company made a mortgage to a man named Gilbert to secure the payment of $122,000 owed by the rock company. By the terms of the mortgage the rock company agreed to make monthly payments of $1,333.33 for five years, and monthly payments of $666.37 after the five-year period.

The rock company was not delinquent in respect to the payments, but it failed to pay the taxes on the property. The delinquent taxes totaled the sum of $2,735.87.

Gilbert did not communicate any notice to the rock company of the default in the payment of the taxes. The rock company overlooked paying them. Without any notification Gilbert sued to foreclose the mortgage. The rock company paid the taxes and asked the court to *prevent* foreclosure of the mortgage.

In holding in favor of the rock company the higher court said that under such contracts payment of the taxes by the rock company fully restored the security.

On the other hand, it is well for readers to realize that many higher courts have upheld the law that if a mortgagor defaults in making *agreed monthly* payments the holder of the mortgage may foreclose.

## Questions and Answers

*Legal Editor,* PIT AND QUARRY: I was a partner in a cement block business, and I sold my half in the business to my partner. The dissolution of partnership agreement states that: "Each of the parties retains a one-half interest in all accounts receivable held by the partnership——"

The partnership held a contract with the USBR for the purchase of sand and a deposit was required before any sand could be used. It will be necessary for the new company to make a new contract with the USBR for sand. Under the terms of the partnership dissolution, should I receive one-half of the deposit (as an account receivable) or does that go to the new company?

The agreement further states that I agree not to engage in the manufacture, sale, distribution or solicit orders for or handling concrete products within a radius of 35 miles of the city, for a period of one year from the date hereof. Is this clause legally binding? B.

*Answer:* The deposit is not an account receivable. Therefore, you cannot recover any part of this deposit. This is so because the deposit is a partnership "investment." In other words, it was made for purposes of producing profits for the partnership.

Yes, a clause is valid which restricts you from entering into competitive business for one year in the territory from which the partnership drew business. Thus if the partnership sold its products within the radius of 35 miles from the city, you cannot legally enter into a competitive business, directly or indirectly, within this territory for a period of one year.

*Legal Editor,* PIT AND QUARRY: We keep our books on the accrual basis. We are having difficulty over proper method of charging off losses and crediting income for income tax purposes. Can you supply us with a ruling on this? F. S. Company.

*Answer:* According to a new higher court decision a company which keeps books and makes returns on an accrual basis must list the income in the year in which the taxpayer's *right* to the income

is fixed, although it may not be actually received until a later year. On the other hand, an entirely different rule is effective with respect to deductions. This court held that the taxes on all kinds of *listed* income of a corporation, under the accrual system of bookkeeping, must be paid the year it is received, or the right to receive it is apparent, but if for any reason this same listed income must be charged later as a loss, it must be deducted *the year* the corporation *realizes* that it is a loss.

For example, in *Commissioner of Internal Revenue v. Blaine, Mackay, Lee Company,* 141 Fed. (2d) 201, reported April, 1944, it was shown that a corporation kept its books on the accrual basis and made its returns for federal tax purposes on that basis.

In 1935 the corporation had certain income. This income became a "pay out" or loss in 1936 and 1937. The higher court held the reimbursements made by the corporation in 1936 and 1937, for the sums which it had received in 1935, were *not* deductible from the corporation's gross income for 1935, but must be deducted the years it was "paid out." Also, see *Commissioner v. Security Flour Mills Company,* 135 F. (2d) 165, to the same effect.

*Legal Editor,* PIT AND QUARRY: Sometime ago we discovered that a seller did not deliver to us the quality of merchandise called for in the contract. We thought, however, that we had best not object. In fact we made two installment payments after discovering these facts.

Now, we have decided to cancel this contract and we are demanding that the seller take back the merchandise and refund our money. What legal procedure shall we follow? Patrick Gravel Company.

*Answer:* A seller is liable for the full consequences of his fraudulent acts as a general rule. However, there are records of higher court decisions denying purchasers relief, although the seller practiced actual fraud or legal deceit. While the law is well established that a purchaser may rescind a contract on the basis of the seller's fraud, yet the rescission suit must be *promptly* instituted. Otherwise the purchaser may forfeit his legal right to rescind the contract.

See *Sherman,* 180 S. W. (2d) 565, reported July, 1944, where a purchaser sued a seller to rescind a sale contract on the ground of fraudulent representations. The purchaser discovered the fraud immediately, but instead of notifying the seller he made a payment after he discovered the fraud.

The higher court refused to allow the purchaser to rescind the contract, and said:

"Here the buyers treated this property as their own after discovering the alleged fraudulent representations, and even made a payment of $40 on the note. It is clear that by so doing and by their delay in acting to rescind the contract they have waived their right to a rescission."

Therefore, it is quite apparent that you cannot avoid the consequences of this contract to which you refer.

# TRAFFIC News Digest

### CENTRAL FREIGHT ASSOCIATION DOCKET

**Docket 83157 (2)**—Establish on sand and gravel (except blast, core, engine, filter, fire or foundry, furnace, glass, grinding or polishing, loam moulding and silica), in open-top cars, carload minimum weight 90 percent of marked capacity of car, except that when car is loaded to full cubical or visible capacity, actual weight will apply, from Kenneth, Ind., to Crown Point, Ind., 110 cents net ton, subject to Ex Parte 162 increase.

**Docket 83281 (1)**—Establish on limestone, agricultural, unburned, in open-top cars, minimum weight 90 percent of marked capacity of car, except that when car is loaded to cubical or visible capacity, actual weight will apply, from Bellevue, O., to the following Ohio points: Collins, 66 cents; Kipton, 72 cents; Oberlin, 77 cents; Wakeman, 83 cents per net ton, subject to Ex Parte 162 increase.

**Docket 83288 (1)**—Establish on slag, crushed or crushed commercial (not granulated), a product of iron and steel blast or open hearth furnaces, in bulk,


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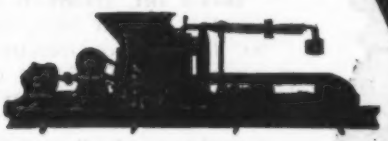

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carload minimum weight 90 percent of marked capacity of car, except that when car is loaded to full cubical or visible capacity, actual weight will apply, from Hamilton, O., to Lincoln, Ill., in closed cars, 242 cents; in open cars, 204 cents per net ton, subject to Ex Parte 162 increase.

**Docket 83293 (2)**—Establish on sand, all kinds, and gravel, carload, in open-top cars, minimum weight 90 percent of marked capacity of car, except that when loaded to full cubical or visible capacity, actual weight will apply, from Urbana, O., to Lorain, O., 138 cents per net ton, subject to Ex Parte 162 increase.

**Docket 83306 (2)**—It is proposed to establish on sand (except blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, moulding or silica) or gravel, in open-top cars, carload minimum weight 90 percent of marked capacity of car, except that when car is loaded to full cubical or visible capacity, actual weight will apply from Dresden, O., to Alexandria, 171 cents, and to Richmond, Ind., 149 cents net ton, subject to Ex Parte 162 increase.

### ILLINOIS FREIGHT ASSOCIATION DOCKET

**Docket IRC 511-589**—It is proposed to establish on agricultural limestone, carload, from Valmeyer, Ill., to Boulder, Ill., $1.02 per net ton, subject to Ex Parte 162.

**Docket IRC 511-590**—It is proposed to establish on stone, broken, crushed or ground, in open-top cars, carload from Valley City, Ill., to Wabash Railroad stations in Illinois, also Keokuk, Ia., and Hannibal, Mo., the following rates in cents per net ton:

| | |
|---|---|
| Jacksonville and Naples, Ill. | 69 |
| Arnold and Springfield, Ill. | 84 |
| Timewell, Ill. | 97 |
| Keokuk, Ia. | 117 |

**Docket IRC 511-591**—It is proposed to establish on sand (blast, core, engine, filter, fire, furnace, foundry, glass, grinding, moulding, polishing or silica), carload from Ottawa and Wedron, Ill., to Streator, Ill., a rate of 70 cents net ton, not subject to Ex Parte increase. Present rate 58 cents net ton.

### SOUTHWESTERN FREIGHT BUREAU DOCKET

**Docket 41957 (1)**—Proposed to amend Southwestern Lines tariff 270-A by establishing a rate of $2.06 per net ton on carloads of sand and gravel from Pueblo, Colo., to Stratford, Tex., in lieu of existing combination rate of $3.17 per ton.

**Docket 52045 (1)**—It is proposed to reduce present rate on dolomite, roasted, Narlo, O., to Rio Grande Crossings from 44 cents per 100 pounds to 42 cents per 100 pounds, carloads, minimum weight 60,000 pounds, on traffic exported to Mexico.

### WESTERN TRUNK LINE NEW APPLICATIONS

**Docket E-41-851**—Limestone, ground or pulverized, unburned, carload minimum weight 60,000 pounds from Cannon, Mo., Hannibal, Mo., Louisiana, Mo., Marblehead, Ill., Quincy, Ill., and White Bear, Mo.

| To | Proposed—Rates in cents per ton of 2000 pounds. Rate 25220 Scale |
|---|---|
| Flora, Ind., Owensboro, Ky.. | 259 |
| Winchester, Ind. | 281 |
| Willow Branch, Ind. | 270 |
| Madison, Ind. | 292 |
| Princeton, Ind. | 248 |
| Dalton, O. | 369 |
| Leesburg, O. | 325 |

## Trade Literature

**The pieces of literature listed below can be obtained direct from the manufacturers named, or requests can be addressed to Pit and Quarry's "Service to Readers" Department.**

MODEL C500 IMPULSE-SEQUENCE TIME CYCLE CONTROLLERS. Bulletin No. C305. 12 pages. The Bristol Company, Waterbury, Conn.

GERLINGER LIFT TRUCKS. 22 pages. Department 4, Dallas Machine & Locomotive Works, Inc., Dallas, Ore.

LINK-BELT ROTARY DUMPERS FOR MINE CARS AND RAILROAD CARS. Book No. 2048-A. Special Advance Section of Link-Belt Car Dumper Book No. 2048. 19 pages. Link-Belt Company, Chicago.

HUMPHREYS SPIRAL CONCENTRATOR. Bulletin 5. 8 pages. The Humphreys Investment Company, Denver, Colo.


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# NEWS OF CONCRETE MANUFACTURERS

## John A. Denie's Sons Co. Builds $100,000 Plant, Adds 100 Mix Trucks

Officials of John A. Denie's Sons Company of Memphis, Tenn., have announced that they expect their new $100,000 ready-mixed concrete plant to be in operation very soon. The new facilities will be equipped with machinery to mix concrete to any specification up to a 4½-cu.-yd. load and to drop it in two minutes into a waiting agitator truck, stated Sam Johnson, chief dispatcher.

Denie's Sons already operate 40 ready-mix trucks, and they have ordered 100 more for the new plant. The firm has contracts for two big jobs, one involving 25,000 to 35,000 cubic yards of concrete, and has recently filled other contracts for a Sears-Roebuck warehouse and a plant for International Harvester.

Covering nearly two blocks, the new plant will include a fireproof garage, shops and offices, rail facilities, underground sand and gravel bins and a conveyor system to the 80-ft. tower. The two main structures will be made of steel and concrete blocks. Supervising the construction is Frank Weulker, a Denie staff member.

## Clay Products Industry Presents New Modular Sizes

The recent decision of the clay products industry to convert flue linings to modular sizes conforming to the American Standard Basis for the Coordination of Masonry Units (A 62.2—1945; a 62.3—1946) represents an important step in the steady progress of dimensional coordination. A table of the new modular sizes is given below.

If concrete products manufacturers are to continue to supply brick and block for chimneys and fireplaces, they will undoubtedly have to redesign their masonry units to fit the new sizes of flue linings. Although this will necessitate an immediate changeover cost, we believe that the long range economy of the standardization of units to modular sizes will broaden the market for concrete masonry units and justify the initial expense.

## Death Takes J. H. Black— Brick Firm Head for 51 Years

John H. Black, 79, president and founder of the John H. Black Co. of Buffalo, brick and concrete products firm, died recently at his home in Pasadena, Calif., where he had lived for the last 15 years. Mr. Black founded the Buffalo firm in 1896 and had been its president since that time.

The firm also operates a brick manufacturing plant in Jewettville, N. Y. A son, J. Murray Black, is treasurer of the firm.

## Karl P. Billner Given Brown Medal by Franklin Institute

Karl P. Billner, president of the Vacuum Concrete Corporation of Philadelphia, Pa., has been awarded the Frank P. Brown medal of The Franklin Institute "in consideration of his invention of a practical process for treating concrete, together with the development of suitable equipment whereby the qualities of the concrete are improved and the elapsed time of construction is reduced."

Mr. Billner, who came to the United States from Sweden in 1906, designed and supervised the construction of the first concrete bridges in Oregon in 1913. In 1925 he formed Aerocrete Britain, Ltd., in London and later the Aerocrete Corporation of Canada and America.

Among the businessmen seeking to follow the current price-cutting trend is a Detroit block manufacturer, Walter Kurtz. Mr. Kurtz, who operates the Concrete Block & Products Company and the Concrete Stone & Block Company, announced that prices of his products would be cut 10 percent.

**Table of Sizes for Modular Clay Flue Linings**

| Minimum Net Inside Area (Sq. In.) | *Nominal Dimensions (Inches) | Outside Dimensions (Inches) | Length (Inches) | Minimum Wall Thickness (Inches) | Approximate Maximum Outside Corner Radius (Inches) |
|---|---|---|---|---|---|
| 15 | 4x 8 | 3.5x 7.5 | 24 ±0.5 | 0.5 | 1 |
| 20 | 4x12 | 3.5x11.5 | 24 ±0.5 | 0.625 | 1 |
| 27 | 4x16 | 3.5x15.5 | 24 ±0.5 | 0.75 | 1 |
| 35 | 8x 8 | 7.5x 7.5 | 24 ±0.5 | 0.625 | 2 |
| 57 | 8x12 | 7.5x11.5 | 24 ±0.5 | 0.75 | 2 |
| 74 | 8x16 | 7.5x15.5 | 24 ±0.5 | 0.875 | 2 |
| 87 | 12x12 | 11.5x11.5 | 24 ±0.5 | 0.875 | 3 |
| 120 | 12x16 | 11.5x15.5 | 24 ±0.5 | 1 | 3 |
| 162 | 16x16 | 15.5x15.5 | 24 ±0.5 | 1.125 | 4 |
| 208 | 16x20 | 15x5x19.5 | 24 ±0.5 | 1.25 | 4 |
| 262 | 20x20 | 19.5x19.5 | 24 ±0.5 | 1.375 | 5 |
| 320 | 20x24 | 19.5x23.5 | 24 ±0.5 | 1.5 | 5 |
| 385 | 24x24 | 23.5x23.5 | 24 ±0.5 | 1.625 | 6 |

*Cross section of flue lining must fit within rectangle of dimension corresponding to nominal size.

## Census Report Shows 940,000,000 Concrete Units Produced in 1946

Production of lumber, brick, nails and other building materials has been, and still is, pitifully inadequate, and the ensuing labor strife has not eased the situation. Cement, on the other hand, has been the *one* important building material which has enjoyed relatively unrestricted plentifulness. Therefore, it was evident that the production of concrete masonry units would zoom in 1946, but until the U. S. Bureau of Census released their concrete products report, estimates of production were haphazard at best.

Output of concrete block in the U. S. reached a record mark of over 940 million units during 1946. In addition, a total of 218 million concrete brick was produced during the same period.

Almost 3,800 plants, including all known producers employing at last one wage earner, were in operation at some time during the year. Of these, approximately 378 produced brick, while all of the rest produced concrete block. Eighty-seven of the brick manufacturers produced no concrete block, but their brick output was more than one-half of the total output.

Total block output during 1946 more than doubled the 400 million blocks recorded for 1945, while output of concrete brick during the year was three and one-half times that of 1945.

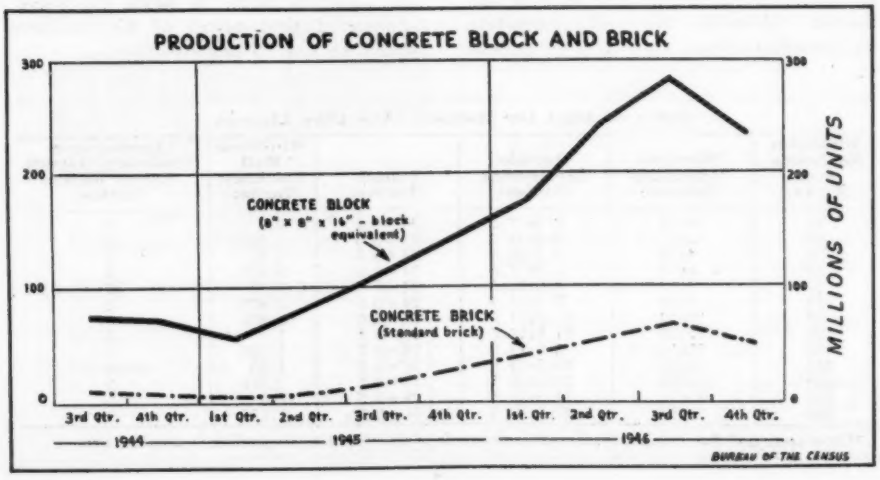
It is interesting to note that 37 percent (1,262 plants) of the total number of plants produced 84 percent of the total output. Among the larger plants producing at the rate of 2 million or more units annually, 3 percent (100 plants) produced 29 percent of the total. The average type of plant appears to have an annual production of about 375,000 units.

Of the total output of block during the year, 59 percent was reported as made from heavyweight aggregate and 41 percent from the lightweight aggregates such as cinders, pumice, perlite, and expanded shale or clay. A relatively larger proportion of the blocks produced by the larger plants constituted lightweight block. Of the total block output of plants producing 500,000 or more block during the fourth quarter of 1946, 58 percent represented lightweight block. For smaller plants the proportion was only 33 percent.

During the year of 1946, Pennsylvania ranked first as a producer of concrete block, followed by Michigan, Ohio, New York and New Jersey. These five states accounted for 37 percent of the total production. North Carolina ranked first in the output of concrete brick during the year, followed by Georgia, Florida and California. These five states accounted for 41 percent of the total brick output during 1946.

Naturally, these production figures are indicative of the exaggerated lack of competitive materials. When production of other building materials returns to normal, a certain amount of shrinkage may be expected in the concrete masonry unit field. We feel, however, that concrete products have gained an advantage in the building industry that they will never lose.

• Quarterly production of block and brick.




## Saginaw Firm to Open Plant With 700-Yd. Daily Output

Construction has begun on a modern concrete manufacturing plant for the Saginaw Rock Products Company in Saginaw, Mich., according to word from Elmer L. Huebner, president. Both transit and plant-mixed concrete will be produced. The new facilities, including a 420-ft. river dock, will be in operation this summer.

Mr. Huebner stated that his firm had requested the Michigan Securities and Corporation Commission to permit an increase of capital stock from $104,000 to $150,000. The anticipated daily maximum output of the new plant is 700 cubic yards of concrete.

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The Loveland Concrete Products Company of Loveland, Colo., established by Jacob Kauffman in 1946 to manufacture concrete building blocks, has been purchased by William Fabrizius of Loveland and his father, Henry Fabrizius of Wakeeney, Kan.

## Two California Products Associations Name Officers At Annual Meetings

The 1947 destiny of the California concrete-products industry is being directed by G. F. Steigerwalt of the Haydite Products Co., McNear's Point, and J. A. Allen of the Hollostone Co., North Hollywood. Their elections came during the course of the recent annual meetings of the Northern California Concrete Masonry Association and the Concrete Masonry Manufacturers' Association of Southern California.

Other officers of the northern association are E. H. Judd, vice-president, and R. D. Rader, secretary-treasurer. Assisting Mr. Allen in guiding the affairs of the southern group are Dave Shepersky, vice-president (San Diego Concrete Products Co.); James Kennington, secretary-treasurer (California Brick & Tile Co., Pasadena); and Edw. Sills, executive secretary.

The meeting of the northern California group took place in the Leamington Hotel in Oakland on April 28. Production and marketing problems were discussed at length, the group insurance plan which has become operative among the members was explained in detail, and E. P. Ripley (General Concrete Products Co., Van Nuys) spoke briefly as an invited guest from the southern group. Mr. Ripley reported that while wages and materials have continued to rise, a recent survey has indicated a reduction of the actual cost of constructing concrete-masonry walls.

The southern California organization gathering was held in the Elks' Club in Los Angeles on the afternoon and evening of March 28. Panel discussions were undertaken on the subjects of new machinery, admixtures, proportioning and lightweight aggregates. Building codes and their effects on the industry were explained by Albyn Mackintosh, Los Angeles consulting engineer. Later there were discussions on price stabilization, cost accounting and overhead.

The Concrete Masonry Manufacturers' Assn. of Southern California has just concluded a blanket wage contract with the A.F.L. providing for an increase in the scale for skilled workers of 30 cents hourly and 20 cents for unskilled workmen. Under the new scale, machine operators and other skilled employees will receive $1.45 hourly, with the new rate for common labor in plant and yard set at $1.20.

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## 600 Units per Hour Produced At New Michigan Block Plant

One of the leading industries of Marquette, Mich., the Campbell Supply Company, has installed a new block machine which can produce 4,800 units in one 8-hour shift. Operations are now carried on in a Quonset building.

The firm was established in 1900, and the production of concrete blocks was added to the company's line in 1922. Lincoln B. Frazier is president and general manager of the concern.

# Big Chicagoland Ready Mix Plant Adds Dump Truck Deliveries

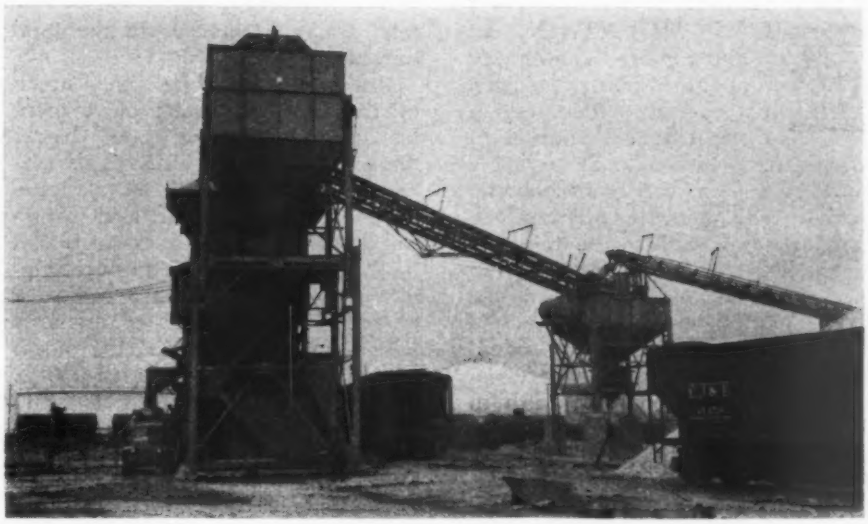
By R. W. SPAKE

another ON THE SPOT report

DUMP truck deliveries are now being made, with ready-mixed concrete bearing Pozzolith cement-dispersing agent, by Certified Concrete, Inc., of East Chicago, Ind. This company has recently added six Maxon "Dumpcretes" to their fleet of ready-mix delivery trucks, and report highly satisfactory performance. They have been doing high speed volume hauling faster than was heretofore possible, according to G. H. Maywald, secretary of Certified Concrete.

Since a large proportion of Certified Concrete's customers lie within a short distance of the central-mixing plant, the Dumpcretes are proving to be an excellent hauling medium. Only short hauls, around two miles, have been made so far. Slump is held to four inches or under at point of delivery, and tests at the end of 28 days indicate strengths of more than 2500 p.s.i.

Large steel companies, refineries, and other industrial users in this district, which is in the heart of one of the great factory areas of the United States, take almost all the output of the company. Quantity orders are the rule rather than the exception, and mixing is generally tailor-made to fit the customer's requirements.



• A scene at the plant of Certified Concrete, Inc., East Chicago, Ind., showing bulk cement cars being unloaded (right) and an agitator truck being loaded (left). The conveyor flight comes from the tunnel under the stockpile (right).

In general, 1 pound of the dry Pozzolith mixture is added for each bag of cement used in the mix; or ½ gallon of the Pozzolith liquid for each bag of cement. Either standard or high-early-strength solution is made up in a 500-gal. tank located in the boiler room, and is pumped automatically to the dispenser on the batching floor. While not all customers specify the use of the Pozzolith, more and more of them are asking for it, and seem to be pleased with the characteristics of the concrete so treated.

With the addition of the dump trucks to the company fleet, a number of other changes have been made in the plant, which was previously described in PIT AND QUARRY, August, 1945.*

A new T. L. Smith tilter mixer has been delivered and will soon be installed in the central-mixing plant. Aggregate is now stockpiled directly over a new materials-handling tunnel extending nearly 190 ft. along one side of the yard. This tunnel has ten feed gates, which can be heated in cold weather to prevent

(*Continued on page* 202)

*Avery, William A., "Custom-Made Concrete a Specialty by Plant Designed to Suit Customers," PIT AND QUARRY, August, 1945, pp. 119-120.

• Left: An agitator truck being loaded with ready-mixed concrete. The mixer operator has a clear view of the surge bin and agitator.

• Right: A new dump-type delivery truck backs under the central mixing plant to receive a load of ready-mixed concrete.

# Growing Michigan Concern Justifies Owners' Faith in Venture

By WALTER E. TRAUFFER

another ON THE SPOT report

IRON MOUNTAIN, an up-and-coming community of about 11,000 population in a sparsely-settled section of the Upper Peninsula of Michigan, is fortunate in having a new and modern concrete block and ready-mixed concrete plant which compares favorably with those in much larger communities. It has this plant because officials of the Lake Shore Engineering Co., especially Albert Hoyle, vice-president and Robert C. Hoyle, advertising manager, have unbounded faith in the industrial future of this area, which has many natural resources. They and other progressive citizens have long tried to lure new industries to Iron Mountain but were always hampered by the lack of suitable buildings and building materials. They had to go over 200 miles away to get steam-cured blocks for their own plant, which went into operation on April 1, 1946.

The business for the block and concrete plant has come from industry and from private city and farm construction. Most of the blocks sold have been used for basements and for farm buildings, with a large but less steady demand for industrial projects. A new foundry in Iron Mountain took 24,000 blocks and large quantities are being produced for a machine shop, a new hospital and various manufacturing plants. The same foundry took 7,000 cu. yd. of concrete and the other projects are taking similarly large quantities. Much concrete is also sold for sidewalks, footings, basements, city work, utilities, etc.; and farmers take about 20 percent of the total output.

Running three shifts daily much of the time the block department has been producing 2,000 blocks daily with one machine. This machine has produced over 1,100 blocks in one 7-hr. shift and the installation of a second machine has more than doubled the output. Shipments are made within a radius of 60 miles and, as much of this area is in northern Wisconsin, the blocks are made to exceed the 1,000-lb. 28-day strength specified by that state rather than the 700-lb. Michigan specification.

Ready-mixed concrete production began early in May, 1946, with three truck mixers and has averaged about 100 cu. yd. per 8-hr. day. With the additional trucks on order this output will be increased. Commercial testing laboratory concrete mix designs are used and laboratory tests of the concrete are made at regular intervals. Deliveries have been made up to 27 miles but most are within a 20-mile radius.

Universal Atlas Duraplastic cement is used in all concrete and has been found to have definite advantages for both blocks and concrete. The sand and gravel aggregates used are hauled from a nearby plant in one of two dump trucks. These and a G.M.C. 4-wheel-drive platform truck are also used for delivering blocks. Sand, pea gravel, and 1- and 1½-in. gravel are used for concrete and sand and pea gravel for blocks.

The trucks haul the aggregates to 4 ground-level concrete bins with a combined capacity of 150 cu. yd., or to stockpiles. A Unit crawler crane with a Chrysler gasoline engine, a 35-ft. boom and a Williams ½-cu.-yd. clamshell bucket rehandles and distributes these materials and feeds them to the ready-mix bins. The 70-cu.-yd. 3-compartment C. S. Johnson steel bin is equipped with a 2-cu.-yd. weigh batcher of the same make. This discharges the batched aggregates direct to the truck mixers. Cement from sacks is discharged through a chute into the mixers and water from a deep well is measured in a volumetric tank.

The three original truck mixers are 3-cu.-yd. Chain-Belt Rex high-discharge units mounted on Army surplus trucks, 2 G.M.C. and one Studebaker. The mixers are driven by LeRoi gasoline engines. These trucks have 3-axle drives (including the front) and have proved ideal for this work in a section where mud, sand, snow and ice are the rule rather than the exception. Loaded, these trucks negotiate the worst possible terrain, go through the deepest mud and climb the steepest grades. In building construction they take their loads right down into scraped-out basements, a big advantage to the contractor. In the sugar sand common to this locality these trucks wade through hub deep without hesitating. A job

(*Continued on page* 202)

• A view of the ready-mixed concrete block plant and yard of Hoyle Bros., Inc., Iron Mountain, Mich., taken during a season better adapted for the skiing for which this area is famous.

1. The ½-cu.-yd. crawler crane which is used to rehandle aggregates to plant bins.

2. The 2-cu.-yd. weighbatcher which measures aggregates to the truck mixers.

3. One of the 3-axle-drive truck mixers which have never yet bogged down in the heaviest going.

4. The two 10-cu.-ft. mixers and the skip, which serve the two concrete block machines.

5. A closeup of one of the two vibrating-core block machines which has manual packing and raising levers.

6. The gasoline lift-truck which does all the handling of racks in the plant and the yard.

# "THE KILN THAT COULDN'T BE BUILT" CURES BLOCK FOR PRODUCER-INVENTOR

another ON THE SPOT report

ROBERT M. GRAY has used inventiveness and ingenuity to turn his block plant into a model of economy and productive capacity. From the aggregate—blast furnace slag dating from 1865—to the kilns—circular automatic marvels of

**By ROBERT W. SPAKE**

his own invention—the plant reflects Mr. Gray's ability to solve problems in an efficient and practical manner.

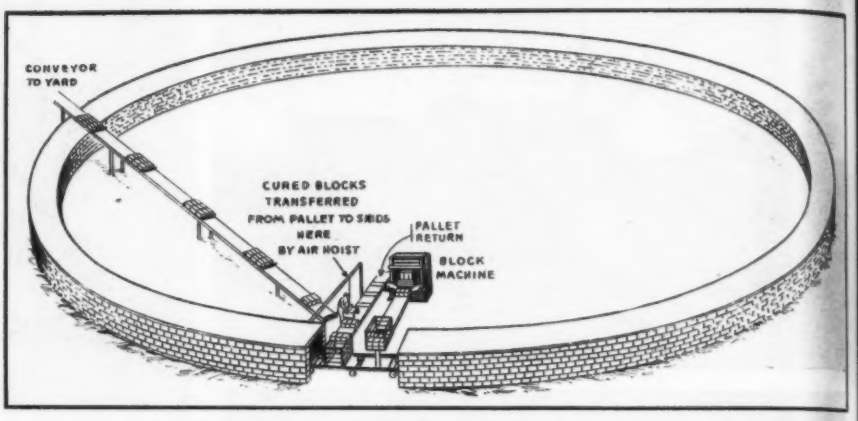
Post-war industry (Civil War) brought a blast furnace to Florence, Ala., in 1865. It operated there for 50 years, and was finally dismantled in 1915. Left in place was a 50-year accumulation of slag. Thirty years after the last slag was dumped, men with drills and dynamite started producing coarse aggregate for the new plant of Gray Concrete Products, now located almost on the site of the old furnace.

Actually the company has been in business since 1941, with a plant located in Sheffield, Ala., across the Tennessee river from Florence. With the development of the circular kiln, a new plant was necessary, and the dictates of space and the proximity of a suitable aggregate brought about the move to Florence. Although construction began in 1946, and production of block is now under way, the plant is still being built, with a second circular kiln even now under construction.

Since the principal use of the products—8- by 8- by 16- and 4- by 8- by 16-in. block—is for home building, a high production rate is desirable in these days of housing shortages; and with five other companies in competition, low cost of production is definitely to be sought after.

Under these circumstances Mr. Gray felt justified in taking the considerable risk of endeavoring to construct what others had attempted, but what no one had been successful in producing—a circular automatic kiln.

After many trials, and a number of disheartening disappointments the 60-lb. railroad rails originally used for the moving track were found to be unsuitable, and the present I-beams were substituted.




• An early simplified drawing of a Gray circular kiln. The kiln is actually below ground level and discharges to lift-trucks, not to a conveyor. (See June, 1944, PIT AND QUARRY, p. 99)

The track had a tendency to break near a weld, and until the joints were heat treated, failure of the track was common. The reader can imagine the consequences when the hydraulic rams would exert their tremendous pressure and a broken track would permit the misdirection of this force. Ripped up flooring, broken walls, twisted racks, bent rails, destroyed block—all these problems were faced and beaten by Mr. Gray. In the end Mr. Gray found the answers that had heretofore escaped inventors, and produced the kiln that experienced manufacturers said could not be built.

But he went beyond this—not only did he produce the kiln, but he succeeded in adapting the block machine so that it would feed the green blocks into the curing racks automatically. Further, the cured blocks are unloaded from the racks by a special conveyor, and are touched for the first time when they are loaded onto a lift truck for transportation to the block yard. In the newest model a minimum of pallets are required, since the pallets (steel) are automatically brushed, oiled and stacked and feed themselves back into the block machine without human aid.

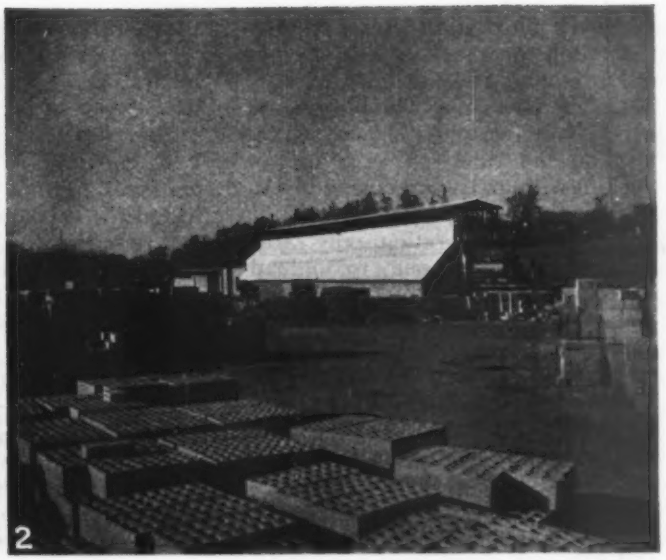
The kiln itself is in the shape of a circle with a radius of 77 ft. 2½ in. with a cross-section 8 ft. high and 12 ft. wide. Appropriate racks, plant made, travel with I-beam tracks around the 485 ft. circumference of the kiln in roughly 20 hours. Steam, at 175 deg. F., supplied by a 65 hp. horizontal return tube W. T. Adams boiler, cures the block so that it is ready for use upon leaving the kiln 20 hours later.

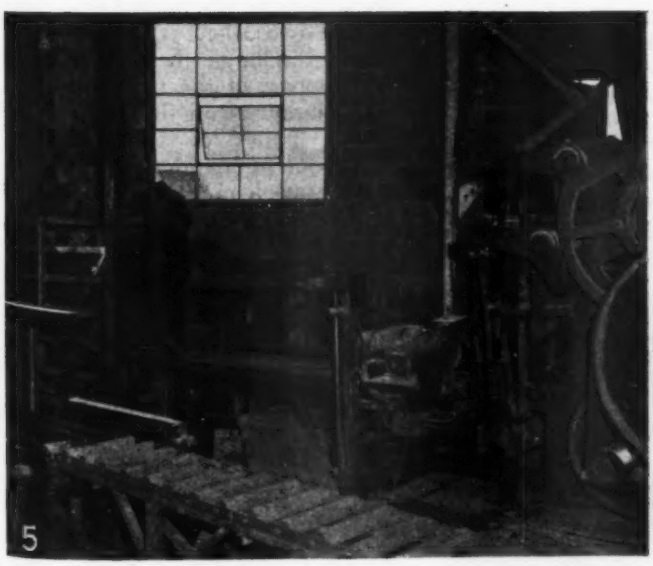
The I-beam tracks that support the 160 racks move on steel rollers and are propelled 38½ inches in a counter-clockwise direction at regular intervals by electronically controlled hydraulic rams exerting 15 tons of pressure. Cutler-Hammer switch-gear is used throughout the complicated electrical circut.

The racks themselves are ingeniously arranged so that the blocks and pallets, when fed by a chain conveyor from the block machine, will automatically enter the five successive tiers of the rack. When one rack is full it drops back onto the tracks at floor level, and moves into the kiln. A fresh, empty rack moves into position to be filled. The blocks are never lifted—rather, the rack is elevated by a hydraulic ram similar to those used in filling station grease racks.

A rack is idle for only that space of time that it takes the kiln to make two 38½ inch movements.

• The roll-crusher, which reduces oversize from the vibrating screen.





1. A view of the Gray Concrete Products plant, showing the new circular kiln under construction (foreground), the block plant (right) and materials storage building (left rear).
2. The block yard above the existing underground 145-ft.-diameter circular kiln. The materials building is seen in the background.
3. Robert M. Gray at the gyratory crusher which reduces the slag aggregate to minus 1-inch.
4. A view of the block plant, showing the cement bin and conveyor flight from the materials building.
5. Blocks leaving the machine and being racked automatically. Note the entrance to the circular kiln below the window.
6. Blocks moving to the racks (foreground) and leaving the racks (center).

From the illustration it can be seen that while one rack is discharging, one is empty, and the third is loading. There is an obvious economy here. Only five racks are out of the kiln at one time—the rest are in the kiln with green and curing blocks in their tiers.

At optimum operation, only three men are needed—one to unload blocks, one for the lift truck, and one at the mixer. The kiln itself is made up of two concentric concrete block walls, with a concrete floor and monolithic concrete roof, and is completely covered with earth. The upper surface, above and inside the kiln perimeter, is used as a block storage yard. All movements of loading racks, conveyors, pallets and kiln are completely automatic, electronically controlled.

Aggregate is blown loose from the slag pile and is loaded into trucks by means of a 1-cu.-yd. power shovel. Two Ford 4 cu. yd. dump trucks do the hauling to a 15 cu. yd. hopper in the plant area, which is less than ½ mile away from the working face. The slag is dumped through a plant made grizzly into the hopper, and is fed out onto a 24-in. belt conveyor by a 24-in. Jeffrey pan feeder. The head pulley of this 70-ft. conveyor is a Dings magnetic pulley, which keeps tramp iron from entering the Allis-Chalmers No. 6 Gates Type O crusher set at 1-in. closed side opening. Product of this crusher falls on a 20-in. by 92-ft. belt conveyor. This deposits the crushed slag on a Robins 2-deck 4- by 12-ft. vibrating screen with 1-in. square wire cloth on the top deck, ⅜-in. cloth on half of the bottom deck, and 3/16-in. square cloth on the other half. Oversize (plus 1-in.) material goes off the end of the screen into a bin. A 72-ft. conveyor takes this material back to a Universal 24- by 36-in. roll crusher. The product of this crusher drops on a belt fed by the gyratory, and so onto the screen again. Material passing the first deck and retained on the second (plus ⅜-in., minus 1-in.) drops onto a 44-ft. conveyor, and feeds into a bin. The minus ⅜-in. material goes onto a 22-ft. belt conveyor and is also binned, as is the —3/16-in. material. Concrete block bins are used in every case in this building. A 120-ft. blending conveyor in a tunnel beneath these bins receives regulated amounts from each compartment and places the mixed aggregate on a 178-ft. belt conveyor flight which transports it to a 4-compartment 150-ton Butler bin. From this bin a traveling batcher feeds one of two Besser 50-cu.-ft. mixers on the balcony over the block machines. Ceco hard-facing metal is applied to the mixer blades at 6 to 8 month intervals and has proven to be a successful wear-retardant.

At present 350 bags of cement—National, Lone Star, Lehigh or Magnolia—are used each day. Storage room is available for about 1½ cars of bagged cement. A railroad spur has now been placed and bulk cement will be used to a great extent from now on. A 1000-bbl. Blaw-Knox bin provides storage, together with a Link-Belt cement unloader and bucket elevator.

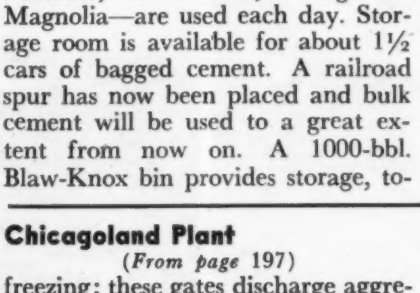
Blocks are sold in a radius of 50 miles around Florence by the company, which does both a wholesale and retail business. All of the actual production of 8500 high quality blocks daily is sold with little difficulty — principally to builders.

Mr. Gray is president of the corporation, and his wife is secretary-treasurer. The kiln and its satellite machine are covered by patents or patents pending.

## Chicagoland Plant

(*From page* 197)

freezing; these gates discharge aggregate directly onto the 24-in. belt of a new Barber-Greene troughing conveyor. Approximately 360 tons per hour are delivered onto the old two-



• The mixer operator's view of the bed of a new dump-type truck, showing the baffles and the "bath-tub" type body.

flight conveyor system, also Barber-Greene, which places the aggregate either in a small dry batching bin, or takes it on up to the three-compartment, 100-ton bin of the central-mixing plant. Normally, the aggregate goes directly to the large bin.

A Northwest "104" crane, with clamshell bucket, is still being used to move the aggregate to the stockpiles from the below-track receiving hoppers. Aggregate is received by rail from the Chicago Gravel Co., Plainfield, Ill.

• A view down the tunnel from the discharge end of the belt. The gates shown permit blending from the stockpiles above.

Another recent addition is an International TD-6 TracTractor, with a Bucyrus-Erie Bulldozer, which is used to move cars and material to grade roads in the yard and to clear snow in the winter.

Ford trucks with Thornton rear ends are still being used in making deliveries and have proven very satisfactory. The new Dumpcrete bodies have been mounted on similar Ford chassis.

## Growing Concern

(*From page* 199)

hopper provided by the company speeds up the turnaround time, especially on slow-pour jobs.

The aggregates for the block plant are drawn through gates direct from the concrete bins into a 16-cu.-ft. skip bucket which has levels marked in it for accurate measuring. Cement is added from sacks. The bucket elevates its load to a hopper from which these materials can be discharged into either of the two 10-cu.-ft. Dunn mixers. These discharge the concrete into the hoppers of the two Dunn Kor-Pak vibrating-core block machines.

The plates of these machines swing out for removal of the blocks to the steel racks which hold 64 standard 8- by 8- by 16-inch blocks. These are carried off to the curing rooms by an Erickson gasoline fork lift truck which does all rack handling. The four curing rooms each hold 11 racks. These rooms have concrete floors, concrete block walls, insulated roofs, and live steam is introduced into them through perforated pipes by an 85-hp. boiler. This has a bin-fed automatic stoker and a 50-ft. steel stack. The rooms are kept at 180-deg. temperature for 12 hours and are then allowed to cool for 4 hours before the blocks are removed to outdoor storage on a 50- by 50-ft. concrete apron.

The boiler also supplies steam for coils in the ready-mixed concrete bins and under the concrete bins.

# The Value of Testing Concrete Products for Compressive Strength

By R. F. MITTEN
Concrete Machinery Division
The Yoder Co., Cleveland, O.

EVERY concrete products manufacturer is familiar with local building codes as to compressive strengths required in different types and grades of concrete products. In the main, these codes are drawn to protect the public by setting up minimum standards for compressive strength, arrived at through years of experience, research and testing, by engineering societies, universities, State, county, and city building authorities, as well as the cement and concrete products manufacturers.

The American Society for Testing Materials has endeavored to give everybody the benefit of all this work by issuing specifications which represent a consensus of the best minds in the country, including producers as well as consumers. These specifications have served as a guide in the formulation of building codes, as well as in drawing specifications for buildings capable to standing up under any dead and live loads likely to be encountered during the useful life of structures.

A special reason why the quality of concrete building units, pipe and concrete has been given so much attention by these authorities, is that the manufacture of concrete and concrete products is one beset with many pitfalls, as most of us have learned through years of hard knocks and unpleasant experiences.

One of the chief difficulties has been that the concrete products man never knows when the end of the day comes, nor soon thereafter, whether his production for that day is good, bad, or indifferent, whether he has been wasting cement and making units way beyond minimum requirements, or whether he has turned out something which some day is going to result in a blackened reputation and loss of business, if not disputed invoices and actual damage claims.

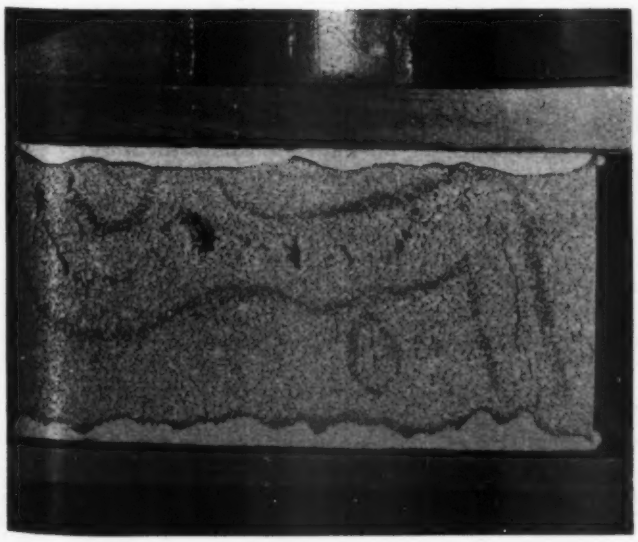
Another handicap has been, and still is, that the making of concrete building units, due to low cost, heavy weight, and competitive conditions, is essentially a local business, therefore, individual plants on the average are small compared with those found in industries commanding a regional or national market, as in the case of steel, chemicals, rubber, and other lines of manufacture. The control of quality of steel, for instance, while inherently more difficult than that of concrete, is rendered incomparably easier because the size of plants and value of output on the average is so great that most steel makers find it not only possible, but necessary and profitable, to maintain research and testing staffs, with their own well-equipped laboratories in which to carry on their work.

What especially complicates matters for the average concrete products manufacturer is that he has not in the past been able to ascertain, in anything short of a week or two, how close his production on any day came to meeting or exceeding minimum requirements of compressive strength. This, of course, is partly due to the fact that concrete must undergo a period of curing before any reliable indication of quality can be obtained.

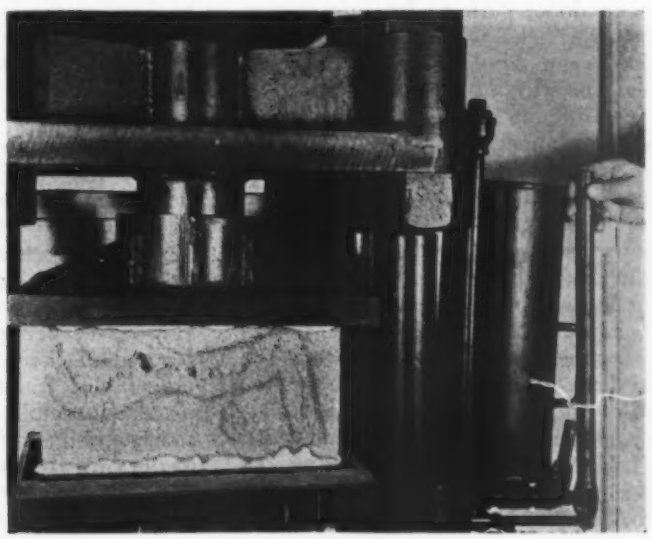
Secondly, there has been the necessary time lag, ranging from a minimum of two days up to a week or ten days, between the time he sends samples out to be tested and the time he receives the laboratory reports.

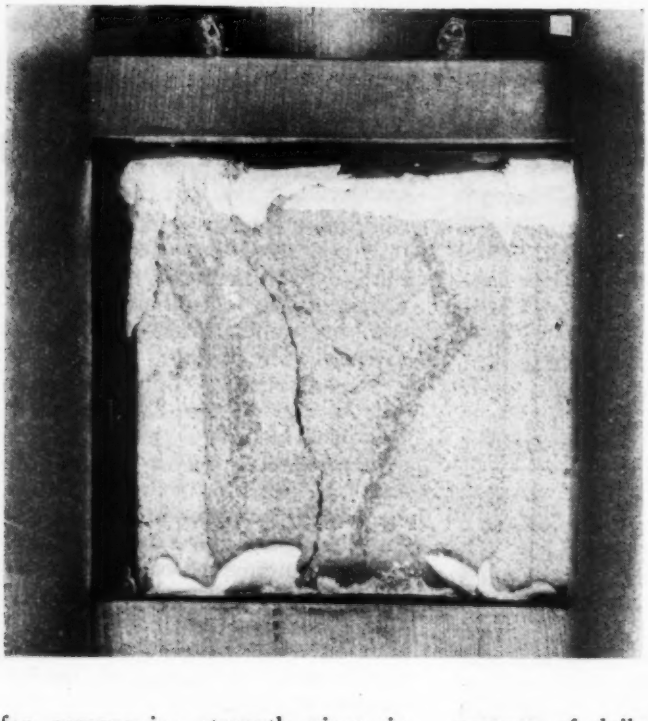
Obviously he cannot, after he has operated a plant for one day, close it down while waiting for samples to be cured, sent out for testing and the report received. He must go right on manufacturing, test or no test, in order to stay in business. Even after a report is received, while he frequently finds something to be very wrong, he still does not know anything for sure beyond the figures

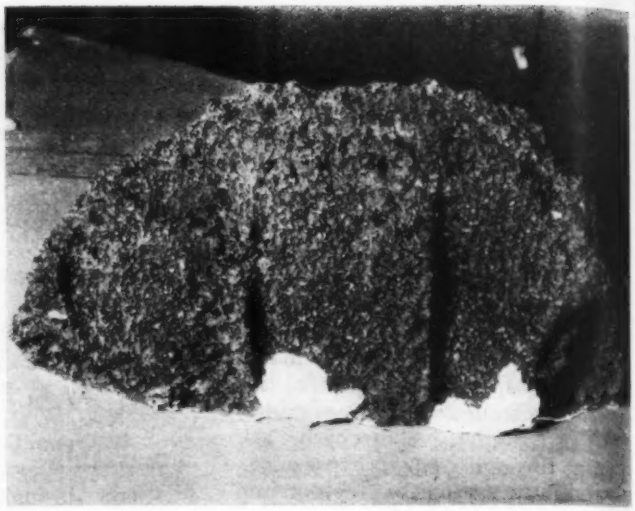
• The fracture in this slag block, extending through the major area, is normal and such as would be found in a block which was well made with proper grading, mixing, water and curing. However, this block was below standard and the concrete adjacent to the fracture was weak and crumbly. It developed that while the heat of the kiln was high, there was insufficient moisture present, and the block was really dried. Steps were taken to correct this condition and the blocks were greatly increased in strength and met the test as Grade A Blocks. This was a fault in curing.



• The same block, showing details of a testing machine with top pressure plate mounted on a spherical bearing block for proper alignment. The block has been properly mounted for testing. The hand lever at the right actuates a very small plunger to provide the pressure on the block.







• Left: Another slag block showing a fracture at the end. While from a different plant, symptoms were the same as the first block, namely, insufficient amount of water in the curing process. This condition was corrected.

• Right: A section of a fractured cinder block which was very much below strength. The cinders were soft and powdery, resulting in a poor block. The source of the cinder supply is of great importance in making a good block.

for compressive strength given in the report. If there is anything wrong, he must still go on manufacturing while addressing himself to the task of discovering the cause of the trouble before he can apply the remedy.

The question also logically occurs to him: "Does the showing for that day, now a week or so past, give a true picture of what we are doing today, and of what we have been doing in the interval?" To make doubly sure it seems necessary to have more tests made, with the loss of another week or more, while in the meantime, he begins to check up on everything and everybody in his plant to see if he can discover what the report does not reveal, namely, exactly what made those units deviate so far from the standard.

Even if he happens to put his finger promptly on the sore spot, he cannot undo the damage that has been done, perhaps for one or two weeks back, when production of that same kind of units continued with or without interruptions.

Is it any wonder, under these circumstances, that some concrete products manufacturers—and some pretty good ones at that—have come to look upon laboratory tests as more or less of a post mortem, and the expense connected with it more or less as money wasted? Daily testing has been urged by some, not as a completely satisfactory answer, but at least as means of giving test results more meaning and reducing the time lag between manufacture and correction of irregularities, to the greatest extent consistent with the nature of the process. The added expense of daily testing, while not prohibitive, is still considerable.

## A NEW IDEA IN TESTING

In past discussions of the importance of daily testing, I do not recall that anybody seriously considered the possibility of any large proportion of the concrete products manufacturers being able to do their own testing, but since this has now become a practical possibility, it may be well to reconsider the subject in the light of the completely new situation now existing. I refer, of course, to the fact that concrete products manufacturers are now able to obtain, for installation in their own plants, a simple, sturdy, and dependable testing machine, not only meeting the essential requirements of the A.S.T.M., as to how such machines should be designed and built, but doing it at a cost so low as to bring it within reach of most plants. In fact, as far as cost is concerned, there should be an actual saving compared with having outside tests made.

This phase of the subject, however, is of infinitely less consequence to the majority of concrete products manufacturers than the several advantages to be gained, especially in shortening the time lag between date of manufacture and completion of tests. Also, there is the advantage of being able, without going out of their own offices, to examine the fracture of every substandard sample, thereby obtaining some very instructive indications as to the cause or causes of the trouble. This opportunity to examine fractures on the spot is one by which the concrete manufacturer is especially well qualified to profit, because he knows the most about the virtues and weaknesses of his own equipment, raw materials, processing and men, and with the fractures before his eyes he is able to put his finger on the sore spot with the least possible delay. This is something no outside laboratory could do for him nearly as well, and certainly not as economically.

Reverting to the subject of time lag between production and discovery of irregularities, the operator will be able to cut it in half or better by doing his own testing.

In fact, he can know within six hours after removing samples from his curing chambers just what they test, and if he wishes, on account of an unexpected showing, to make doubly sure it is truly representative of his current production, he can immediately test more samples and obtain the results overnight.

If the second showing is bad, he will, by examining the fractures, obtail tell-tale evidence of the cause or causes, so that he may take immediate remedial measures of the kind most effective and economical, rather than penalize himself by merely increasing the cement content.

In the busy season, when he must strain every effort to keep up with the day-to-day demand, and when the curing period has to be cut to the lowest limit consistent with safety, daily testing will be especially valuable in keeping every factor affecting quality up to the standard, and thus prevent unfortunate and costly experiences.

A few specific cases will be cited to illustrate how troubles can be most quickly corrected through compression tests followed by examinations of fractures.

A certain plant, located in a city large enough to support good testing laboratories, was paying $200.00 a month for having test samples picked up frequently and obtaining reports on results. The management decided to install a testing machine. The first tests were made on ten units, half of them made with one kind and the other half with another kind of light-weight aggregate, all four days old. The next day they already had the test figures, showing an average of about 750 p.s.i. for one class of aggregate and almost 1400 p.s.i. for the other. Visual inspection of fractures of the former indicated improper grading of aggregate. This was immediately traced to its source and corrected. For the other aggregate, a saving of cement was immediately made possible. Within three days after making this change, test figures showed they were still safely within the strength requirements.

With the off-grade blocks, however, although the amount of cement was not changed, tests with more carefully graded aggregate soon proved that these units were now also of full strength.

As the production of this plant is quite large, the owners were highly pleased with their new investment. At first, daily tests were continued for a short time, without other expense than the amount of labor involved—which is trifling—until they were sure everything was running smoothly. In the future, they intend to test daily whenever there is a possibility of trouble from any source, such as one might expect after making changes in personnel, curing period, obtaining new supply of aggregates, putting into use new equipment, etc.

Another manufacturer had just made some important improvements, installing a big new vibrating machine, crushers and screens for processing cinders, also a testing machine, all at a cost of about $80,000.00. His proportioning was in accordance with the recommendations of the various makers of the equipment, yet his first batch of test samples, to his alarm, averaged only from 400 to 450 pounds. Examination of fractures indicated insufficient water, also an excess of coarse particles with insufficient fines in the area of the fractures, indicating incorrect proportioning. Production of full-strength units was thus restored in one-third of the time it would have taken without this machine, again without increasing the amount of cement in the mix.

Still another manufacturer found that some blocks made of his best aggregates were consistently fracturing at one end. Investigation showed that the mold boxes were not being filled uniformly. Mechanical corrections were made and the difficulty eliminated.

## Hand Versus Power Operation

Testing machines may be hand or motor driven, the latter of course being somewhat more expensive. The hand-operated unit has one distinct advantage over the power-driven one, in finer control of speed, stopping and starting, for the purpose of watching the progress of incipient fracture.

The A.S.T.M. specifications for such machines require that "the speed of the moving head of the testing machine shall not be more than .05 in. per minute." This is important in order to obtain dependable results. One hand-operated machine showed a speed of only .35 in., or well within the maximum limit. Moreover, when a unit is tested and the first slight noise is heard, indicating incipient fracture, one may instantly stop, then proceed, listening for the progress of the fracture until complete failure. In this way the correct reading is obtained at point of ultimate strength, and the fractured surfaces, not being disturbed, will be intact and give the maximum opportunity for ascertaining the soundness of the structure, or the presence of irregularities, as the case may be.

The exterior appearance of the unit tells very little about its interior structure or compressive strength. Only by actually fracturing it and studying the type of fracture and the structure of the material, can sound conclusions be reached. For this reason it is wise to consider the various factors which determine the strength of a concrete masonry unit.

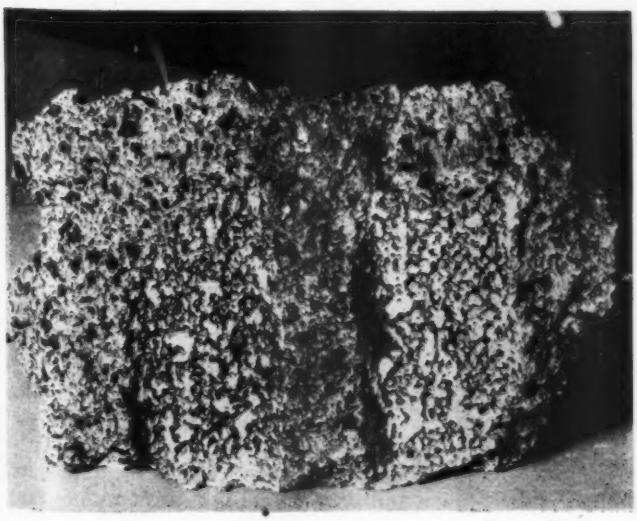
1. *The Strength of the Aggregate Itself.*

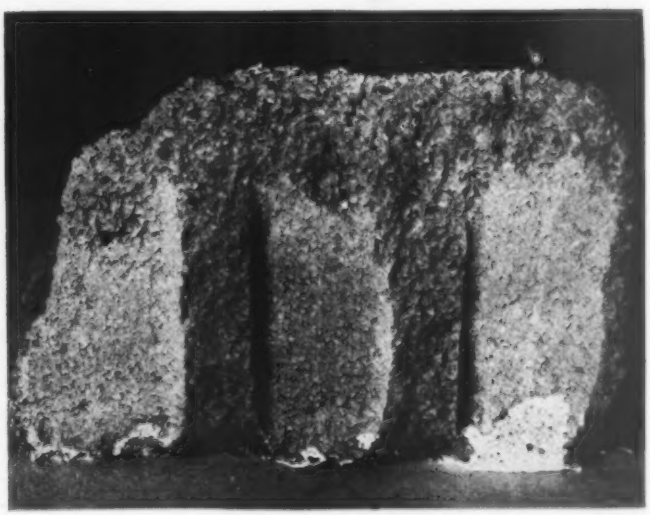
If a unit is composed of particles which in themselves are weak, then the unit itself will be weak. This fact seems to be frequently overlooked. Therefore, the first question that a block maker should ask himself is: "Does my aggregate have the necessary strength to make a unit which will meet the test?" If there is any question, crushing tests should

(*Continued on page* 207)

• Left: A section of another cinder block which showed standard strength. The cinders were hard; and although the grading could be improved, the product was up to standard.

• Right: A section from a sand-and-gravel block which was up to standard strength. Examination shows that there was an excessive amount of fines. By using more gravel, cement could have been saved and the strength of the block maintained.





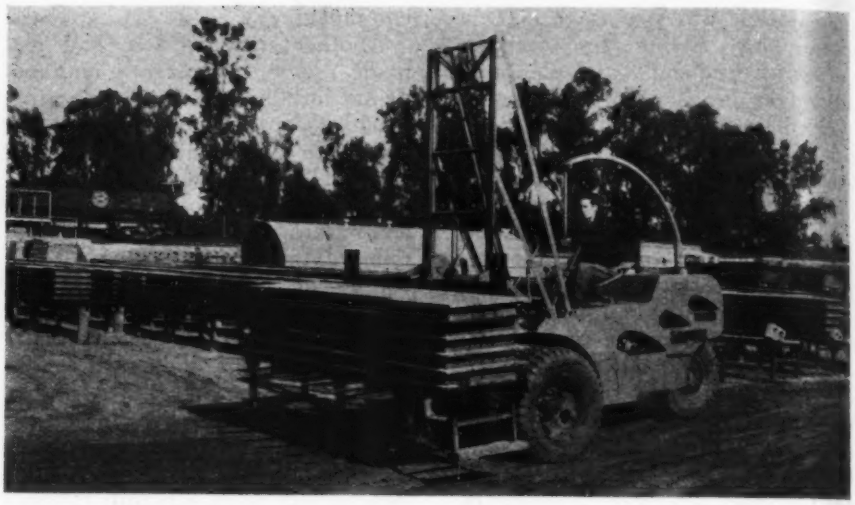
# California Operator Aims at Output Of 100,000 Units Daily

By HARRY F. UTLEY

another ON THE SPOT report

TYPICAL of the current transition of the concrete-block industry in the Los Angeles area from a large number of small producing plants to a fewer number of high-output operations is the new plant of the Ward Concrete Products Co. in suburban Inglewood. The Ward plant is a model layout and, while its initial production is at the relatively high rate of 1,100 units (4- by 8- by 12-in.) per hour, Dwight A. Ward, president, stresses the fact that, within a few months, enough additional equipment will have been installed to triple this capacity. As a matter of fact, Mr. Ward plans to erect two or three other strategically-located plants which will ultimately give the company a total daily capacity of 100,000 blocks.

A newcomer in the ranks of concrete-block makers, Mr. Ward is a prominent Los Angeles industrialist who is best known as the founder and head of the Ward Refrigerator & Manufacturing Co., pioneer manufacturer of commercial-refrigeration equipment. Through his wide acquaintance among southern California engineers and architects, he was aware of the seeming reluctance with which concrete masonry had been accepted because of a wide variance in the uniformity of the output. Convinced that a product of certified high standard would be eagerly sought by reputable builders, he erected his new plant which went into operation in December of 1946.



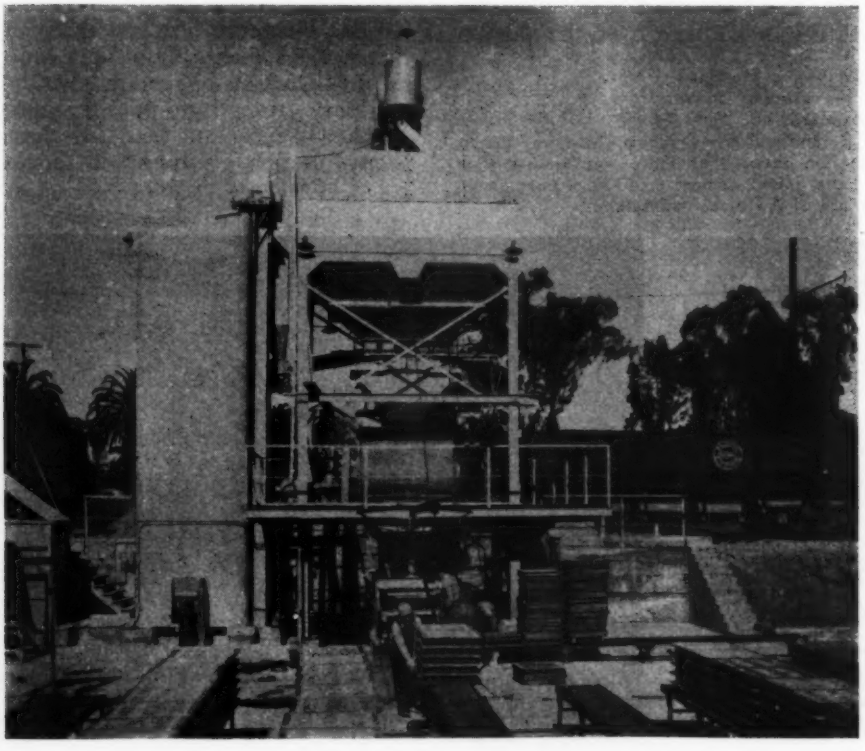
• A lift-truck transports a roller-conveyor section loaded with 120 day-old blocks to the stockpile at the Ward Concrete Products Co., at Inglewood, Los Angeles.

Units produced at the Ward plant are molded on an automatic high-speed vibrator of a new type designed and built by Stephen Flam. The machine makes six of the 4- by 8- by 12-in. units at a time, completing approximately 3½ operating cycles per minute. A second machine, soon to be installed, will be of similar design except that it will make eight blocks at a time, or about 1,600 per hour.

The block machine, utilizing Flam-patented vibration, is hydraulically operated through automatic controls. The operating sequence is controlled by electric micro-switches which actuate solenoid valves in the hydraulic system. The concrete, compacted in the mold by vibration, is given a ⅛-in. finish squeeze by hydraulic pressure to press the tops and sharpen the edges of the units. Because it is the first machine of its type to go into operation, a brief description of the operating cycle, which takes about 18 seconds, may be of interest. With one of the 28- by 28-in. plain wooden pallets in position (1) the mold is pulled into position and automatically clamps to a polished base plate, (2) vibration starts simultaneous with concrete feeding into the mold, (3) vibration stops, mold moves into position under press with pallet below, (4) press squeezes unit, then ejects block downward through mold onto pallet, (5) mold returns to vibrator, same impulse moving palleted blocks horizontally in opposite direction to off-bearer.

The plant uses bulk cement. Aggregates and cement are batched by weight and the mixing water is metered. The Noble Co. supplied the aggregate bin, weigh batcher and bulk-cement tank as a complete unit.

• A general view of the plant and the roller conveyors. The bulk cement tank is at the left.



The bin has a live-storage capacity of 105 tons of aggregates and is divided into three compartments. Aggregates arrive by rail and drop into two concrete track pits with a total capacity of 400 tons. Hydraulically-controlled gates feed the sand and pea-gravel to a bucket elevator leading up to the bin. Cement may be received either by rail or truck.

After proportioning, the batch is discharged into a 30-cu. ft. Flam mixer below the batcher and immediately above the block machine hopper.

Roller conveyors carry the palleted blocks away from the machine and the units remain on the conveyor sections in parallel rows overnight. The next day the sections, loaded with blocks, are transported by a fork-equipped Scoopmobile to the stock piles where they are placed in a position convenient for stacking into the pile. Each conveyor section accommodates 120 standard units and the Scoopmobile carries the empty conveyor sections as well as the pallets back to the block machine on the return trips.

A sprinkler system keeps the units moist during the curing period which is never less than 21 days. A natural aid to curing, Mr. Ward points out, is also the fog which rolls into Inglewood almost nightly from the Pacific Ocean. The company has tested and investigated the merits of steam curing but has been unable to note any appreciable aid to curing by that method. Since the weather never gets below freezing and a somewhat wetter mix is employed in molding the units than in vogue with other machines, present curing methods will continue to be employed.

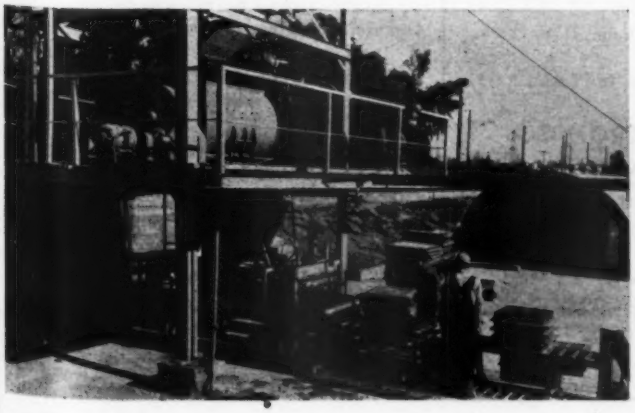
Deliveries are currently being made by a fleet of army surplus trucks purchased by the company, and by hired units. The concern is having a number of specially-designed low-bed truck-and-trailer combinations built for delivering the output.

Blocks are tested regularly by the Smith-Emery Laboratories which certify that they meet or exceed all code requirements. Any units which are not rated perfect in every respect are sold as "seconds". The company plans, however, to equip its own testing laboratory at the plant and will employ a qualified technician to test all raw materials as well as finished products. Equipment for producing 8- by 9- by 16-in. block, the standard size in most other sections of the country but only recently introduced into the Los Angeles area, will also be placed in service sometime in 1947, according to Mr. Ward. Plans are also in the making for the manufacture of joists and other precast concrete products.

The plant is located on a 4½-acre tract completely enclosed with 8-ft. chain-link fencing and is served by the Pacific Electric Railway. Morris Ward is vice-president and general manager and Paul Von Essen is the plant engineer. Both young men recently returned to peace-time activities after serving Uncle Sam, Mr. Ward as a naval flier and Mr. Von Essen as a navy technical engineer stationed at Lockheed's various aircraft plants in southern California.

• The operator at the batch-plant controls. Scale and water meter are at the left.

• Below, left: A view showing the batch box, the mixer and the new-type automatic block machine. Six units are made at a time.
• Right: A bulk-cement truck unloading at the plant.



## Value of Testing

(*From page* 205)

be made separately on the aggregate to determine its strength. Such tests should be made in a commercial testing laboratory.

2. *Proportioning of Fine and Coarse Materials.*

This is vital in securing the desired strength with a minimum amount of cement. When a block or unit is fractured, the distribution of the fine and coarse particles can be noted.

3. *Segregation.*

If segregation occurs, some blocks will be stronger than others. Inspection of fractured units will show up these variations.

4. *Water.*

Insufficient amount of water will produce a weak block and fractures will reveal a crumbly, powdery structure.

5. *Mixing.*

Lack of proper mixing will produce a weak block and is one of the things which can be checked by testing.

6. *Cement.*

Too lean a mix will result in weak blocks, but increase of cement content should be postponed until all other factors have been found O.K.

7. *Moulding.*

Uneven distribution of the material in the mold box will form a block of varying density. Examination of the fractures will reveal this, enabling prompt correction.

8. *Curing.*

Regardless of the method of curing, the rate of curing can be determined by successive compressive tests, spaced at desired intervals of time.

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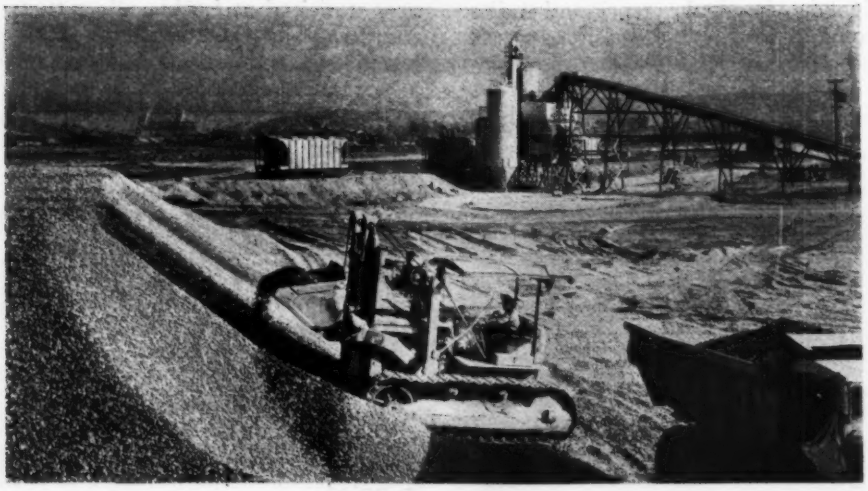
Edgar C. Keast, 44, owner and operator of a concrete products plant at Hastings, Neb., died recently at Hastings.



← At the Friant Dam, California, a Traxcavator-equipped "Caterpillar" diesel D7 tractor loads trucks from a stockpile. The trucks haul the material to hoppers, and from these it is transported to the concrete batching plant by a conveyor belt. Four grades of material are used — sand, pea gravel, ¾-inch rock and 1½-inch rock. The D7 Traxcavator team handles all material used in the batching plant for concrete to be used in the lining of the Friant-Kern Canal.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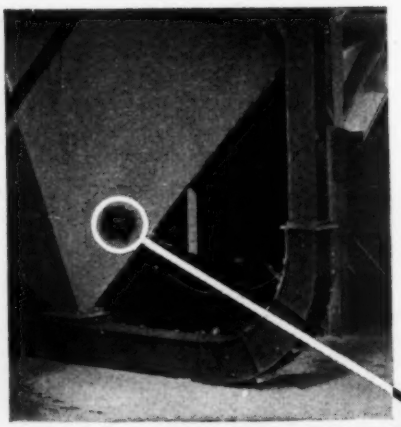

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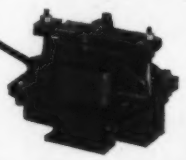


## Edison as Housing Expediter Was Born 40 Years too Soon

In this centennial year of the birth of Thomas A. Edison, it is appropriate to recall that his biographers have said of him that much of his thinking was years ahead of the times.

During the first decade of the present century he pioneered in a field that is just now coming into its own—that of prefabricated housing. He developed a system of "poured homes," by which prefabricated forms, designed for repeated use, were set up and an entire house, concrete from top to bottom, was poured and completed within a week.

The times did not warrant the development of the method commercially, but today "poured homes," developed along the lines charted by Edison 40 years ago, are among the types of prefabricated housing now becoming popular.

## G.W. Hutchinson, Official Of N.C.C.M.A., Dies at Raleigh

George W. Hutchinson, who was formerly the secretary of the North Carolina Concrete Masonry Association, died recently at his home in Raleigh. He was for years a member of the American Road Builders' Association and at one time a materials engineer with the North Carolina Highway Department.

Mr. Hutchinson was well known as the founder and editor of the *North Carolina Engineer*, official publication of the North Carolina Engineers Society.

## New Jersey Plant to Install Its Own Sand-and-Gravel Plant

At Duck Island, Trenton, N. J., the Parkway Concrete Company reports that it is planning to increase its facilities for ready-mixed concrete production by the installation of a sand-and-gravel plant. The material will be taken from extensive deposits of sand and gravel dredgings on Duck Island, owned by Edward Budney, president of the firm. Mr. Budney also expects to install an oil-dispensing plant on Duck Island.

**What do you want to know about the ready-mixed concrete industry or about concrete blocks, pipes, etc.? The Concrete Industries Yearbook can probably tell you.**